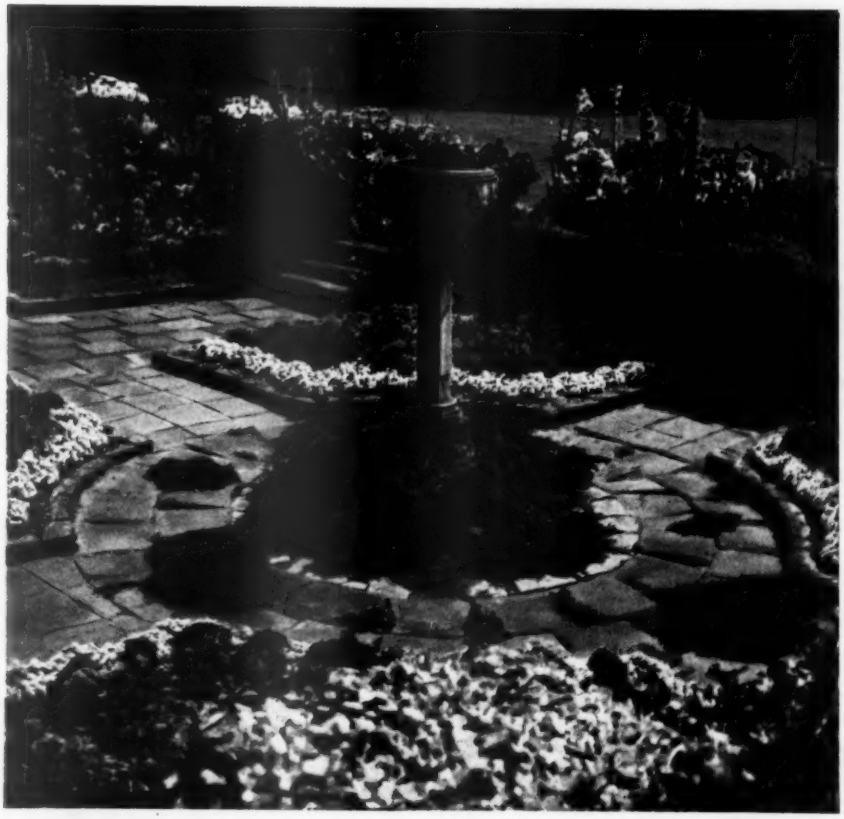
November 1950 25c

Organic Gardening

Gardening without Commercial Fertilizers



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Organic Gardening

Latest Developments in Plant Culture

VOL. 17, NO. 5 NOVEMBER, 1950

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THE COVER

A Sunken Garden in Surrey, England. The geometrical lines and the brilliant colors combine effectively to make this garden an artistic creation.

British Information Service.

J. I. RODALE, *Editor and Publisher* — JAMES W. CRAWFORD, *Advertising Manager*
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Mulching Pro and Con

Over the summer and fall, subscribers have written to us, as requested, about their experiences with mulching in their vegetable gardens. By far, the letters give us a picture of successful and contented Organic Gardeners, but a few bring up the mistakes that must be guarded against.

The magazine would like to publish several letters pro and con each month. If you haven't yet written us about your happy or unhappy results with mulching, try to send us a letter as soon as possible.

Alfalfa Meal for Mulching Seedlings

When the vegetables start coming up we cover the soil with a mulch of alfalfa meal. This makes a tight mulch and keeps the soil moist and the weeds down. We water with the overhead sprinkling system. With this method there is no plowing or cultivating. The soil is so loose that what few seeds do come up through the mulch, can easily be pulled up.

I wish you could see the vegetables in my first bin. The spinach is simply delicious. I just pick the biggest leaves and wash them and set them on the table raw. I never saw such large leaves on a potato plant as we have.

Mrs. Stella Wolfsen
Rte. 1, Box 25, Sutter Creek, Calif.

Pine Needle Mulch for Tomatoes

Just a line to let you know how my first Organic Garden is doing. After reading your article on "mulching", I planted my tomatoes plenty deep with a handful of litter from my chicken house under them. Then

when they were a foot high, I mulched the whole row with pine needles to a depth of 3 inches or more. We have the finest tomatoes in our neighborhood with no signs of any disease. The plants are a vivid green and the fruit is *large*. One orange tomato weighed 1 lb., 9 oz., and we have larger ones on the vines. The vines are 4 inches tall and *loaded* with fruit, and still blooming.

Thomas H. Harvey
Rte. 10, Box 236, Richmond Va.

Mulching Succeeds Where Other Methods Fail

I applied four tons of mixed manure to my own garden last fall, have not dug it in, but have planted the seeds right in the mulch of manure and shavings and bean straw. They have germinated beautifully. I notice that when the corn first comes up, it does not have a good color, but as it gets about six inches high, it turns dark green and shoots right along. I have not dug this garden for two years. The soil is wonderful for making adobe bricks, but mighty hard to garden with the conventional method. One of my neighbors was over yesterday and said that he had given up because the soil was so miserable to work. He thought this method was just about right. I have imported a good many stones and have stone-mulched about half of it. I use gunny sacks, boards, and any thing that is at hand to mulch the rest.

Ted Frost
4790 Jurupa Ave., Riverside, Calif.

Mulching for Earliness

I used the mulch method in my summer garden. We had three weeks of cold nights last spring and the tomato blossoms not only stayed on but set. I had tomatoes 6 weeks early this year. The rest of my garden is just as wonderful. All plants were set out with earth from the earthworm bed, and no sprays.

L. K. Moore
Rio Linda, California

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Bracken as a Winter Mulch

You may be interested in my husband's experience with a mulch of bracken. He put a thick covering of bracken over part of the vegetable garden last autumn and allowed it to remain till the spring on undug soil. The following crops grown on this undug soil are the best we have ever had — shallots, carrots, brussel sprouts and spring-sown onions. A sprinkling of wood ash was thrown over the bracken in the winter. The bracken that had not rotted down was removed to the compost heap before the seeds were sown.

Rachel Weir
Eilden Lodge, Melrose Rd.
Galashiels, Selkirkshire, Scotland

Corncob Mulch

Results obtained in using the organic method for both flowers and vegetables have been extremely satisfactory. We are using ground corncobs as a mulch. This year the garden was planted without doing any spading or cultivating. We merely raked the excess mulch off the rows where we expected to plant the seeds, then made a furrow only deep enough for the seeds.

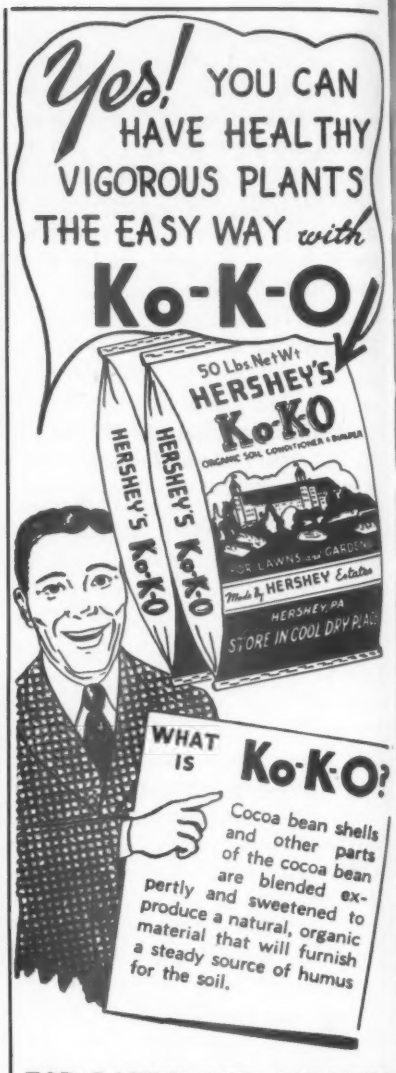
Fred Chambers
c/o National Gypsum Co.
Dist. Office, Luckey, Ohio

Caked and Dry Mulch

I have been a reader of your magazine for quite some time and I have been applying organic methods in my backyard garden, but so far had mostly disappointments.

To start my vegetable garden I first dug out part of the lawn, removed the grass with the roots, put in plenty of steer manure and earthworms into the ground and then cut-grass mulch on the top. I planted tomatoes, beets, carrots, and cucumbers. I watered the ground every day

The first thing I noticed after everything had grown was that the mulch caked up, absorbed all the water and left the ground dry and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the plants began drying up. The tomatoes first grew nicely, but then were affected by a blight, turned black and wilted. The healthy bushes which grew to 7 feet and spread thickly were attacked by big green worms and later by smaller green ones, the latter burrowing into green and red tomatoes and the beets were eaten up at the roots by snails.

As a result I am quite a bit disappointed with organic gardening. Should I have used sprays? I would possibly have some crops.

I. Krimm
2416 E. Pacific Coast H'way.
Long Beach 4, Calif.

Editor's Note: By removing the roots from the soil, you took much organic matter which normally enriches the soil. Fresh manure is unbalanced and should never be applied to the soil immediately before planting. Too much raw organic matter doubtless contributed to your failure. The manure should be added in the fall so that by spring it will be well composted. Crops grown in soil to which green manure has been added immediately before planting may be more or less susceptible to insect pests and diseases.

Leaves Scatter

A problem arose when the leaves were wet and became matted together, collecting many earthworms. The robins came and scattered them all over, sometimes covering up small plants in their search for the worms.

H. L. Reeds,
28 Sussex St., S.,
Lindsay, Ont., Can.

Editor's Note. Leaves will not mat if they are shredded before being used as a mulch. Many types of leaf shredders have been described and advertised in the *Organic Gardening* magazine.

Deficiencies

My husband and I have been ardent readers of *Organic Gardening* for some time, and — although very skeptical at first — we have become organic gardeners almost to a degree. Now, we grant that with certain things we have had great success. Our pea crop was very good as compared to the ones before. All the vegetables were better and are better tasting than before. (The garden was given about an inch of compost last fall, and then was heavily mulched

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Prepare your garden for the winter. Shred and apply to soil ALL GARDEN WASTES and AUTUMNAL LEAVES WITH

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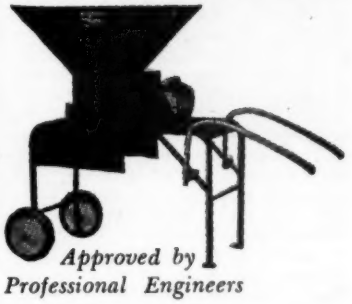

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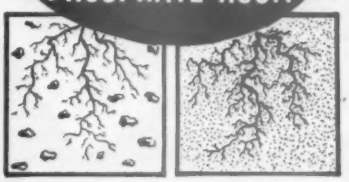
Finer Ground
PHOSPHATE ROCK



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BECHTELSVILLE 4, PA.

with straw that had some manure in it. When it came time to plant, we merely pushed the straw back a little and planted the seeds — most of which germinated very well. No dusts or sprays of any kind were used). But the strawberries produced practically nothing, two small dwarf peach trees died (they might have anyway, as they were far from well). The string beans gave us many delicious beans, but those nasty yellow bean beetles devoured *all* the leaves. The cauliflower and broccoli were severely bitter and were full of holes. And here it comes — that nemesis that no one in your periodical speaks of — the Japanese beetle. Just what does one do to combat him? Granted he leaves the very healthy plants alone while he polishes off the weaker ones, but when those are gone, he turns to the healthy plants, and although he doesn't demolish them, he gives them a good going over.

Mrs. Stacy Lloyd, Apple Hill,
Millwood, Clark Co., Va.

Editor's Note. Your results indicate that your soil is deficient in some of the essential plant nutrients. Before planting again, remineralize your soil by adding phosphate rock and potash rock at the rate of about ½ pound of each for each square foot of surface. Japanese beetles may be appeased by planting something that they like better than garden vegetables, like odorless marigolds. This technique works in our garden.

Immediate Effects of Phosphate Rock

I was interested in your statement that you believed deficiencies in phosphorus in Pennsylvania is only apparent. The plot of ground I gardened last year had been planted in soybeans the year before. These were harvested for hay and after an application of approximately three tons of chicken manure (well rotted) per acre, the ground was disced and barley and rye grass planted. A late, wet fall made a luxuriant cover crop which was plowed under early the next spring. I had only a small quantity of compost which I placed sparingly in furrows where the seeds were planted. The result was a tremendous growth. I planted peas when my neighbors peas were four inches high, and we had peas to eat before they did. There were more peas picked than I had ever had in previous years but I felt we should have had a bigger yield on such luxuriant, healthy vines. Everything grew too well so that I had mostly plants. The peppers were small bushes but only one or two peppers and this was also true of the limas. The potatoes looked wonderful. I kept picking off the Colorado beetles but did not spray and they stayed a beautiful green until frost. However, when I dug up one or two plants I found only one, (but huge), potato.

It was pretty late in the summer when I read an inquiry in the Questions and Answers of *Organic Gardening* about the cause of onions rotting, and the answer was that this showed a probable deficiency in phosphorus. This was the first I had heard of the necessity of applying phosphate and since I found my onions were practically all rotted — not entirely, but a spot on each — I bought some raw phosphate rock and hoed it along the plants.

Even that late, the result seemed miraculous. Because we had such a late fall I was able to pick the lima beans which formed after that application and when we were threatened with a frost I picked three bushels of peppers from 18 plants. The cauliflower which I had planted at the same time as the spring cabbage and which grew to a good three feet with no sign of heads, produced heads after the phosphate application and for the first time I was successful in growing that particular vegetable.

I think my experience with these last two deserve writing about. I had never had any success with either but decided to try them both again with compost. The asparagus arrived after the issue of asparagus last spring, so instead of trenching them as I had done previously, I made shallow plantings using compost only in the row but later putting the rotted chicken manure around each plant. A heavy mulch of oat hulls was placed between the rows which

were covered with rocks. A neighbor gave me one clump of rhubarb which I divided into thirty some plants and I placed them next to the asparagus following the same procedure but using leaves instead of the oat hulls as a mulch. Those thirty some plants of rhubarb grew so profusely that by fall each was almost as large as the one original plant. The stalks averaged twenty inches in length (to the leaf) and a good three inches in circumference. I don't think anyone to whom I showed that crop last fall believed that it had been planted that spring and was all the product of one clump.

Mrs. Ella Hanford
Hershey, Pa.

Announcement

I intend to take a trip through Florida this coming January, and I am wondering if any of our readers have things of interest that they think I ought to see from a farming and gardening view point. Would be glad to hear from readers.

J. I. Rodale

Memo for Organic Gardening

WANTED: Horticulturist teacher to do experimental work at the Organic Gardening Experimental Farm during the summer of 1951. In replying, please state fully your experience and any other data that will aid us in making a choice.
Write to J. I. Rodale . . Emmaus, Pa.

Prospective Visitors To The Experimental Farm:

For the fall and winter months, the visiting hours have been changed to 10 A.M. to 4 P.M. daily except Sundays.

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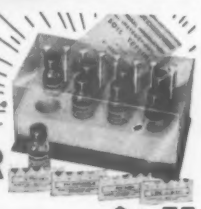

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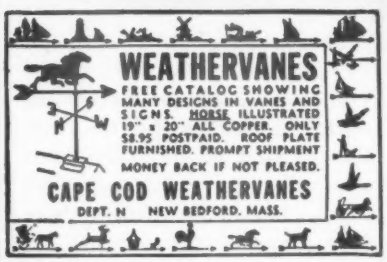
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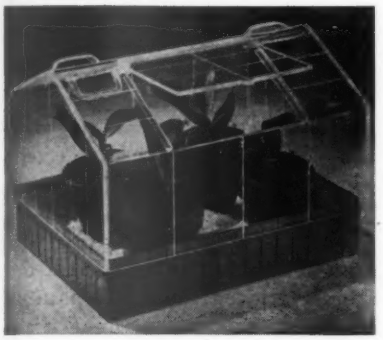

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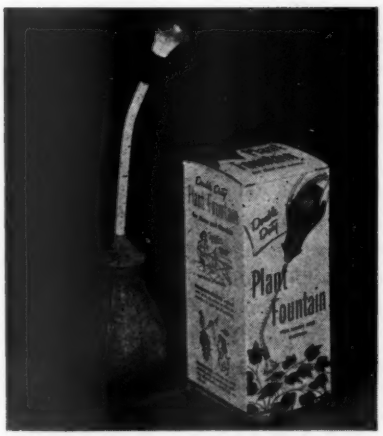

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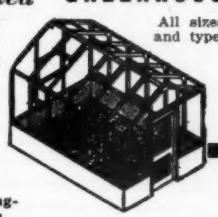

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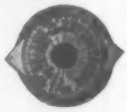

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Organic Food Division
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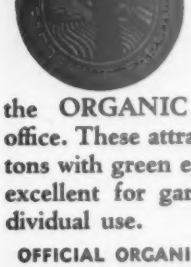

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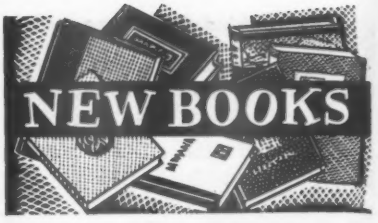

THE LIVING SOIL, by E. B. Balfour. Devin-Adair, 1950. $4.00. Available from Rodale Press, Emmaus, Pa.

Lady Eve Balfour has achieved the difficult task of explaining simply and intelligently to both laymen and scientists the true nature of the soil as a living organism. "My subject," says the author, "is food, which concerns everyone; it is health, which concerns everyone; it is the soil, which concerns everyone; and it is the history of certain recent scientific research linking these three vital subjects."

The information set forth in this book had been so scattered that the ordinary citizen could not possibly have been expected to hunt it up for himself, even if he knew where to find it. The author has therefore summarized "certain scientific research on nutrition and fertility including results that have been obtained in many different parts of the world by practical application of the principles involved."

Lady Balfour begins with the concepts of soil erosion, nature of the soil, and the Law of Return. Shortcomings in our agriculture are reflected in the deterioration in food plants and foods, deterioration in animal health, decline in human health, and decline in fertility. Diseases in plants, insect depredations, and diseases in animals and man are obviously caused by a sick or deficient soil.

Experiments and quotations from the observations of many workers in all parts of the world confirm the cause of the trouble. Adding humus to the soil as compost or as a mulch which eventually becomes humus is invariably followed by a partial or complete restoration of plants and animals to such vigorous health that they become relatively free from the diseases and pests so common in modern agriculture.

Research in the Organic Method

By RUTH RODALE

Roses Like the Corn Cob Mulch

ROSES are definitely improved when mulched with ground or crushed corn cobs, say the New Jersey and Illinois Experiment Stations in their annual reports for 1948-1949. Corn cobs applied under the bushes gave a higher flower number than treatment with rotted manure, a sandpeat moist mixture, or gypsum. Soil prepared with ground corn cobs was comparatively light in texture and drained rapidly after watering. Microorganisms are well pleased with the good supply of sugars and other carbohydrates that become available to mulched plants. But neither station mentioned the high mineral content that is contained in the cobs.

Disease Controlled by No Spray

Agriculturists are puzzled by the reaction of the bacterial spot of peaches to ordinary sprays. No matter what spray the Illinois Experiment Station tried, the trees lost their leaves at a very rapid rate. The disease was found to be increased when sprays were used. Uninoculated, unsprayed trees did not lose any leaves during the entire test period. Trees to which sprays had been applied lost more foliage than did unsprayed inoculated trees. The experimenters even discovered that the leaves started dropping earlier on the sprayed plots.

The Mighty Earthworm

Have you ever wondered just how useful earthworms may be in your soil? Listen to what Hopp, Henry, and Slater have to say (*Soil Science,* July to December, 1948). "Differences in vegetation between barrels that had been inoculated with living earthworms and those that had not were little short of extraordinary. The yield was far above expectations for a soil of such low natural productivity." Yields were especially increased where the soil was protected with a mulch of grass clippings during the winter. Without the mulch, the earthworms had little effect, whether through lack of organic matter or poor survival. A side-track of the experiment was also enlightening. "During the spring of 1948, a colony of small ants infested the barrel that had received fertilizer but no living worms. The ants formed a trail up the outside of the barrel and burrowed into the soil. During the several weeks of activity in May and June, they deposited a large quantity of finely pulverized soil on the surface. At least half the surface was covered with this fine material up to one inch in depth." Even the scientists seem to be learning that the soil insects as well as earthworms can benefit crops. Yields were abnormally high in the barrel just mentioned, and were attributed to the activity of the ants.

Weed Seeds in the Compost Heap

There is more than one way to get rid of weeds and plant disease in the garden. But Grushevoi and Levykh (Institute of Tabach. i Makhoroch. Promulgation no. 141, 1940) let the compost heap take care of it. The agents causing the main tobacco seedling diseases, fungi and virus, as well as weed seeds were killed when green matter was decomposed in a compost heap. It is believed that the fungi and virus are combatted with antibiotics, produced by the microorganisms that break down organic matter. Weed seeds are destroyed in a different manner. The warm temperature of the compost heap is ideal for seed germination. Their dormancy is broken and the seedlings die because they cannot reach the light. Keeping a mulch on a heap or compost pit will then smother any seedlings that do manage to reach the surface.

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Answer to Our Critics

(PART III)

Agriculture of Olden Times

By J. I. RODALE

IN THE last two issues of *Organic Gardening* I have been answering charges leveled at the practicability of the organic method of farming and gardening by Professor Ray Koon, Head of the Waltham Field Station, University of Massachusetts, in an article he wrote in *Horticulture* magazine, in their May, 1950 issue. In the September issue of this magazine in answering that article, I covered the subject of the health-giving value of the organic method. In the October *Organic Gardening* I discussed the adequacy of the supply of residue organic matter available for fertilizer use on farms, answering Dr. Koons argument that there was insufficient organic matter for that purpose. In this issue I would like to talk about the use made of organic matter by the races of antiquity. But first let me quote from that portion of Professor Koon's article which I am going to attempt to answer. Koon says:

"There is nothing new about it (organic matter), yet the proponents of 'organic gardening' would have us believe they have beheld a revelation of something which before was undiscovered. The need for organic matter in the soil has been recognized for centuries. Agrarian races of antiquity saved every ounce of it from any source available. Their very lives depended on it. And as history records, because there was too little of it in proportion to the number who had to be fed, famine stalked across the land and millions perished. Today we fight famine with fertilizer and efficient farm management."

The Organic Method is Ancient but Improperly Practiced

No. We of the organic method have not beheld a revelation. Frankly we have always admitted that it was an old idea. Some of the Chinese have been preserving their soils through the composting of organic matter for four thousand years and we have mentioned this many times. We (THE RODALE PRESS) have published a book called *Farmers of Forty Centuries* which describes these very practices which have enabled China to endure for so long whereas other civilizations which had their beginnings even after China, have perished because they did not understand the part that the saving of organic matter played in their preservation as a civilization. We have written time and again of the Hunzas of Northwest India (my own book called *The Healthy Hunzas)* showing how conscious they were of the importance of every blade of grass. This people had their beginnings in Biblical times and their population is still increasing.

I can safely make this statement, that for every race that conserved their organic matter there were fifty who were profligate with regard to it. The idea that all old-time races conserved every ounce of organic matter from every available source is an erroneous one. I was reading a book recently called *Babylonian Literature,* by A. H. Sayce and in it I came across the following statement: "The garden was sometimes called the orchard, and most houses possessed one. The weeds and waste produce of the ground were burned in the most approved fashion." Babylonia has left so much of its history and of its customs on clay tablets and monuments which the archaeologists have dug up that we have a pretty clear picture of that people and its culture. The statement made by the Reverend A. H. Sayce is based on a lifetime of study of Babylonian records. The people violated the simplest rule of plant and food culture – the destruction of the vital organic matter that was needed in their sandy, desert soils to anchor it and to prevent it from blowing. That is why Babylonia is no more. Babylonia would have fallen long before it did if it were not for its elaborate system of canals which were dug by its various kings, which trapped the rain-waters and fed it to the soil by means of an irrigation system of which the canals were the basis. The Babylonians were conscious of the value of saving water. If they had gone a step further and had made sure that every ounce of organic matter of every kind was put back into the soil, perhaps the Babylonians would have survived to modern times. Today the city of Babylon is just a mound.

Manures Used for Fuel

Something of terrific importance which is generally overlooked is that all of the Biblical and Mesopotamian civilizations including Babylonia, burned manure as a fuel, instead of seeing to it that this valuable organic matter went back to enrich the soil. There is a great deal of evidence of this. It shows that far from every ounce of organic matter was conserved to contribute its share

to holding the land from blowing. It has been shown in my book that the Hunzas who have persisted as a race for thousands of years would not burn manure as a fuel although weaker races surrounding them employ this ruinous practice. The Hunza understands that his well-being is tied in with the use of manure as a fertilizer and would rather freeze to death than burn an ounce of manure. The Babylonians grew too much wheat and barley — crops that required the land to be plowed up and exposed to the ravages of erosion. They did this in order to have products to export in foreign trade. They would have been much better off from the point of view of ultimate survival if they had engaged more in a grassland farming in which more of the land is clothed with a mantle of pasture grass which protects the soil. In a wheat and barley agricultural economy it is that much more important to put all residue organic matter back into the soil.

Man Despoils the Soil

I would like to quote from the writings of a man who has made a scholarly study of bygone races and the effect that ruinous agricultural practices had on their downfall. He is Dr. W. C. Lowdermilk, head of the Conservation Department of the U. S. Department of Agriculture. In the *Land Letter* of June, 1949 he said: "Recently the archaeologists have turned back the pages of history, not merely centuries, but thousands of years. Their post-mortems on buried civilizations suggest that it has been the hand of man, more than climatic change, which has reduced once rich and populous regions to desolation and poverty. After a struggle, a civilization either died or its people migrated to more productive regions. Many ancient civilizations, once reveling in a golden age of prosperity, are crumbling in ruins or lie buried in sands and debris, largely caused by the destructive treatment of the lands on which they were dependent for sustenance. If modern people are to escape a similar fate by man-induced impoverishment and the dessication of their lands, it would seem well to take a measure of these destructive processes and forces, and by intelligent land planning and land use provide for the sustained productivity of agricultural lands and the protection of grass lands and forests for food, textiles, raw materials and continued water supply. America has been developing dessicated and unproductive lands more rapidly than probably ever before occurred."

Further on in this article Dr. Lowdermilk says: "To the United States, doubtless, goes the record in time and extent, for man-made desert conditions . . . Since May, 1934 wind erosion, set in motion by man-made forces, has transformed five million acres of formerly good land into waste areas and great stretches of sand dunes. More than sixty million acres are in the process of wind erosion destruction by the same cause and will follow the desert condition of the five million destroyed acres, unless adequate control methods are undertaken."

One of the fortunate things about the old civilizations of which we have been speaking is that their farming of necessity was done at a slow tempo, because it was all hand work. Today, in the Machine Age, farming has been greatly speeded up. Not only do we have tractors but we have round-the-clock farming. We see plowing at night as well as day. The process of erosion is to that extent accelerated. Instead of taking thousands of years to destroy the fertility of land it may take us only hundreds.

Take the case of Egypt that once was a powerful country. Where is it today? It depended too much on the richness of the river Nile overflow which gave it gratis each year free organic and mineral matter. The people became lazy farmers saying that the Great River would nourish them. They did not gather every ounce of organic matter with which to nourish the soil. They also burned manure as a fuel and do so even today. They do not have a proper conception of the factors that contribute to the fertility of the soil.

The very fact that these old civilizations declined or fell is proof that they allowed valuable organic matter to go to waste. Many historians believe that their fall is due to a weakened agriculture. Ferrari, the great historian has said this of Rome. A typical statement is one that was made in a speech delivered before the Conservation Forum, in Philadelphia, on April 15, 1949 by Fred A. Wirt of the J. I. Case Company, manufacturers of farm implements. He said, "There is nothing new about the disastrous effects of soil erosion, water depletion, and forest destruction. Study of the causes of the downfall of once powerful countries shows that failure to conserve natural and renewable resources had much to do with their collapse. Mention might be made of empires along the Tigris and Euphrates Rivers (Babylonia), of Palestine and Greece."

Poor Land Management

These old civilizations evidently did not have the mentality that went far enough as far as land culture was concerned. Drifting soil covered them in time. That answers itself. With sufficient organic matter in it the soil does not drift. Deserts are man-made. Last month I gave a formula that proved that there always is enough organic matter to operate fully on the organic method. I will review it briefly. In the first place a plant gets less than 10 per cent of its total nourishment from the soil. The rest comes from the air. If a people were very efficient in following the crops that it raises and see to it that after it is eaten the residues of it and all other parts of it are returned to the soil, it will be like a closed circle. There will be more than a sufficiency of organic matter. For example if a carrot is raised and the top green part of it is burned up, then it is a break in the cycle. The excrement or residue of the carrot, voided by the person who eats it, should also be returned to the soil. The Chinese are past-

masters at this but it must be done skillfully. All excrementous matters must be properly and sufficiently composted, otherwise there is personal danger to one's health in consuming feeds so raised. Today, we are learning modern techniques for the proper and quick decomposition of city sewerage wastes.

Professor Koon says that there was too little organic matter in proportion to the number who had to be fed. This is an exceedingly erroneous statement, because there is no such thing as too little organic matter. He might have said that there was too little of *preserved* organic matter. The growing crops always have enough organic matter as part of themselves which if faithfully returned to the soil would be more than sufficient to grow the future crops. There is a reserve of over 90 per cent which a provident nature has created, which comes from the air, which makes the operation of this theory quite simple.

Every food crop must be followed into its channels of consumption and the residues recovered and brought back to the farms. The very fact that these old civilizations crumbled is evidence that this formula was not followed. If it had been, not only would deserts not have come but the state of the people's health would have been better. The health of the consumer of food is closely tied in with the amount of humus in the soil. See my first article in this series. If that had been looked after the people would have better been able to fight off invaders. The peoples who were on virgin soils always have a good record of being able to take care of themselves. As thousands of years elapse and the quality of the soil deteriorates due to the reduction of its organic matter the people become weakened and conquered by stronger races. But the point I wish to make is that these old fallen civilizations did not use every ounce of organic matter in their soils because the facts of drifting sand and conquering armies which come to despoil them, indicates otherwise.

Organic Matter Wasted

Professor Koon says that because there was too little of organic matter in proportion to the number who had to be fed, famine stalked across the land and millions perished. There was much more organic matter available than the people used. They burned up weeds. They burned manure as a fuel. If they had applied the law of return and used all of this material as a fertilizer they could have raised much more food than they did, but this is not the whole story. In days of old a careless husbandry was practiced. Not too much care was exercised in rotating crops. There was too much monoculture. In Egypt it was cotton, cotton and cotton, year in and year out. A mentality that will burn manure as a fuel will not approach farming in general with the wisdom that it requires. Why was manure burned? Because too many of their forests had been cut down and there was not sufficient wood fuel. They cut down trees without replanting. They did not have sense enough to know that the day of reckoning would eventually come, and it did come in the form of famine and disease.

This situation exists in India today where millions of tons of manure are burned as fuel because of a depletion of forests over centuries of stupid destruction. Today the Indian Government is urgently advising municipalities to replant forests and has been encouraging the planting of certain kinds of trees which will come to rapid maturity so that wood from them will be available in six or seven years. There is a tremendous campaign being waged by the Government of India not only to stop the wasteful burning of manure but the encouragement of the reclamation of all city garbage and sewage wastes all over the country. They have appointed a composting officer for the entire country who issues bulletins from time to time. India is determined to close the circle, to operate the law of return, to turn about the tendency which in time would have spelled finis to it and made it an irreclaimable desert.

Destruction of Forests

The downfall of the Hebrew nation in Biblical times can be traced to these practices if one reads the Bible carefully. When the Hebrews entered the land of Canaan it ran with milk and honey. The fertility of the land was fabulous. There was great strength in Israel in the time of David. The Hebrews were able under that King to conquer every nation that surrounded them. The trouble begins in the time of the next king – Solomon, the son of David who sent 80,000 hewers of wood into the forests to cut down wood to be sent out of the country in foreign trade. There was little such shipping trade before Solomon, but the latter was hard put by the demands of his hundreds of wives and the luxury that he wished to dispense. According to the Bible these 80,000 wood-choppers were kept in the forests continually and none of the trees were replaced.

We know the value of forests to absorb the rain-waters. With the land denuded of forests the quality of the crops deteriorate. In the reign following Solomon, weakness enters

into the people. They engage in civil war and break apart into two nations. From then on they continually pay tribute to foreign nations, the ten Northern tribes are carried off into captivity and in a few hundred years the remaining two tribes are taken captive into Babylonia by Nebuchadnezzar. In Ezekiel it shows that conditions had become so bad that there was not even sufficient animal dung to be used as a fuel to bake their bread. They were reduced to using human dung for that purpose. The people did not understand how badly needed were their trees and that for every one cut down another should have been replaced. Such a careless attitude does not indicate a desire to save every ounce of organic matter for return to the soil. In the September issue of the *Organic Farmer* I have gone much more deeply into the agriculture of the Biblical Hebrews and indicated the reason for their downfall. A reading of the history of the great nations that surrounded the Hebrews shows convincingly that they did not know the value of certain basic rules of agriculture. Of one thing they *were* aware – the need for water but they did not know that trees and the preservation of organic matter would give them water.

Manure Used in Manufacture of Bricks

As is true of India so it is true of many other backward countries today. They still do not understand certain fundamental rules of agriculture. I went to Mexico last January and saw dozens of places where rounded cakes of manure were piled up to dry so as to be usable as a fuel. Surrounding Mexico City I saw many small brick-making establishments with big piles of manure which was used as a binder in making the brick. Mexico City is an anomaly. You walk their streets and see huge skyscrapers that they are building and as you walk you observe bricks that are being used in their construction. You visualize the precious manure contained in that brick, and you shake your head. Will those structures endure? I don't mean will the bricks physically disintegrate? I mean will the people disintegrate who eat food grown in a soil that is robbed of manure to put it into brick. It is all reflected in the health of the Mexican people whose span of life is just about one-half of what it is in the United States. And the U. S. is sending agricultural experts to Mexico to show them how to use chemical fertilizers.

Today in the Orient there is much burning of manure. It can be seen every day in countries like Arabia, Turkey, India, Egypt. Why do they do it? Because their ancestors did it. They have inherited this practice. Surely then these races of antiquity from which they stem did not save every ounce of organic matter in their husbandry. But the Hunzas and certain of the Chinese who do save every bit of organic matter and use it in their agriculture are preserving their soils so that they will endure forever and at the same time these people are unusually healthy.

Deficiency of Organic Matter and Disease

A question that is often asked me is, "Why was there so much disease and plague in times past when people did not use chemical fertilizers, since you claim that the use of chemical fertilizers increases human disease? For example why did Ireland have famines and plague?" The answer is that these peoples did not practice what we would call the organic method to the full. Ireland did not use chemical fertilizers but it has been known to burn manure as a fuel and still does it today. It did not rotate its crops properly. It planted potatoes and potatoes and potatoes. Good husbandry was not employed and from time to time the land would rebel for it was not receiving sustenance. Every ounce of organic matter was not being fed back to the soil. In the time of Napoleon, manure was used for the manufacture of explosives. Every farmer was taxed so and so many tons of manure which he had to bring to certain depots from which they were gathered by the Government into explosives manufactories. The land was cheated of it. From time immemorial the farmer did not take enough pains to operate a closed circle and to see that no organic matter left that circle. He was sloppy in his husbandry. He was not aware that in the way he grew his crops there could be more nutrition in those crops for the people that ate them. It is only in the last few decades that a nutritional science has grown up which says we are what we eat. King Solomon did not know that when he cut down a tree he was cutting down vitamins, because vitamins existed at that time although they were not known. Yes, in that day a pomegranate had vitamin C just as it has today.

The Lesson to be Learned

What is the lesson that we can learn from all this? I think it is a wonderful one and when I think of it, it gives me great pleasure as I look into the future. We are making a science of the organic method. We are not going to follow a peasant agriculture because history teaches us that the peasant was ig-

(Continued on page 57)

Photo by A. L. Francis, Los Angeles

Group of Arborvitaes, Cypress, and other conifers.

ORNAMENTAL EVERGREENS

How to use evergreens in home landscaping.

By E. HAMILTON FAIRLEY

IN THE landscape scheme for the small place, the larger type of evergreen such as pines, spruce and firs may be too large, but there are many medium and dwarf evergreens which may be used with fine effect. The Arborvitaes, Junipers and Yews offer a wide variety of material. There are tall columns, pyramids, globe-shaped and low creeping forms. Evergreens give character to the garden, for they have year-round beauty. The coniferous evergreens are the cone-bearing group, although the Junipers and Yews have berries.

There will be border planting along the boundary lines of the property and a section of this could be planted with evergreens. Selecting those that will give interesting combinations in height and form, one or two small flowering trees such as Chinese Crabapple, Redbud, or Silver Bell Tree, may be planted among them. It will depend on how much space is used for this planting, how many trees will be needed, to give height and color in the spring garden. The evergreens may have an edging of spring flowering bulbs planted in fall, for spring beauty.

The planting around the foundation of the house is important. It ties the house to the ground and makes a more beautiful setting for it. Small evergreens may be used across the front of the house and columns for accent points — Arborvitaes, Junipers and Yews against the blank spaces of the wall, and low-growing varieties under the windows. There are neat columns to be had in these groups for planting on either side of the front door, with lower-growing types grouped around them. A group of low-growing evergreens may be planted at the entrance to driveways and walks. In

planning these plantings visit nurseries and see the various types and their form of growth, as well as the texture of the foliage.

The American Arborvitae, *Thuja occidentalis,* forms a symmetrical pyramid of dense growth and green foliage, or it may be used as a hedge. The globe-shaped, compact mounds are also good for formal planting. There are more than half a hundred forms in cultivation. The catalogue of a good nursery will list many of them.

The Chinese Arborvitae, *Thuja orientalis,* or *Biota orientalis* — sold under both names — is a most attractive species for using in mixed groups. It may be planted where the climate is not too severe. It has been cultivated in its many forms for a long time.

The Junipers are a hardy group and may be had in a variety of form and color of foliage. They are easily grown. *J. Chinensis* makes a neat column, effective for framing a doorway or a group of windows. *T. Sabina Tamarix* is among the most popular of the low-growing Junipers. It grows a little over eighteen inches high, but has a spread of several feet. It is useful for foreground planting in groups, at the side of pools and garden steps.

In choosing evergreens, consider their future growth and the space they will occupy in five to ten years. The Yews are useful in many positions in the garden. The English Yew, *Taxus baccata,* and its varieties are choice evergreens. Some are dwarf and spreading. The rich red berries make a beautiful contrast to the dark-green foliage. There is the English Yew with yellow foliage and yellow fruit, *T. baccata* var. *lutea.* The Irish Yew forms a beautiful column of dark-green foliage, effective as a formal accent for flanking a garden gate, or some architectural feature in the garden.

Evergreens prefer a sandy soil well-drained. If the soil is a heavy clay, add some sand, peat moss and well-rotted manure (compost), mix thoroughly. This will make the soil more porous and will put humus into it; or well-decayed material from a compost heap may be added.

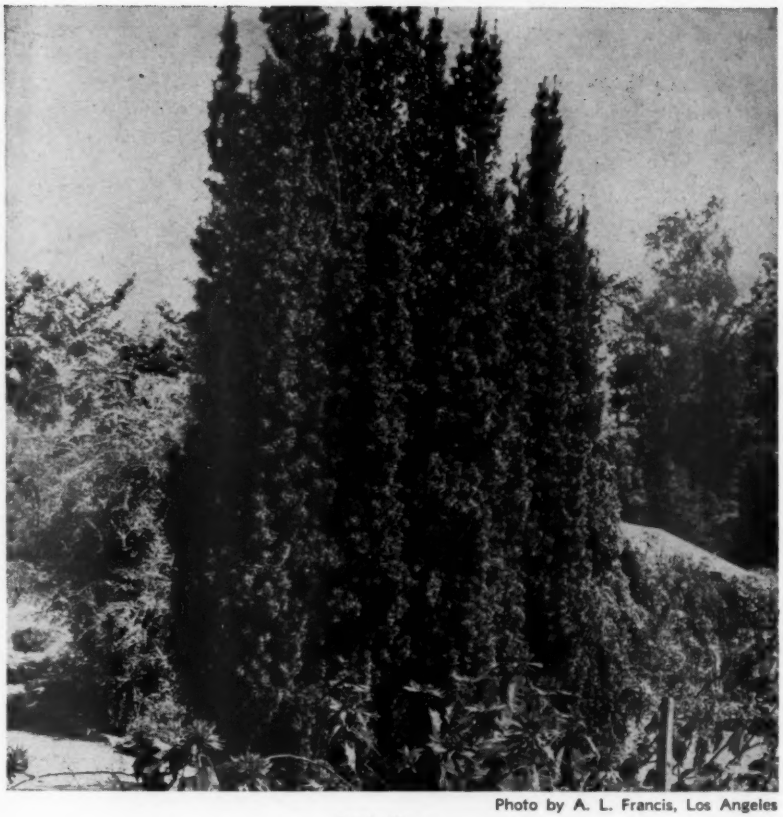


Photo by A. L. Francis, Los Angeles

Irish Yews

Before planting make an arrangement on the ground of the various evergreens, to get an idea of what will give the best effect. They can be changed more easily before planting than after.

In planting make the holes three times as large as the ball of roots. In digging, put the topsoil on one side and the subsoil on the other. In the bottom of the hole place eight inches of compost that is well-rotted and mix with a shovelful of good topsoil. Place the evergreen in position in the hole, and be sure it is straight. Cut away the burlap from around the neck of the plant and fold back or cut off this loose burlap. Fill in the hole with topsoil. When filled to within a few inches below ground level, allow water from the hose to run in gently until it reaches to the bottom of the hole. When the water has drained away, fill in with good loam. Make a mulch over the ground of well-decayed compost or manure that is well-rotted. This will conserve moisture around the roots.

In watering evergreens, allow water to sink into the ground gently so it will penetrate below the roots and keep them in the ground at a proper depth. Water newly planted evergreens at least twice a week until they are established. Sprinkle the foliage when watering.

It is important to buy evergreens where they have been transplanted several times. This root-pruning makes them transplant more successfully.

In spring, before new growth starts, feed them with liquid manure. Fill a burlap sack with cow manure and put it in a barrel of water for a day or two. Before using this liquid, water the evergreens with clear water as far down as the roots, and when the liquid manure is poured on the ground it will spread more evenly through the soil. Apply this tonic again about the first of July.

Photo by Alden Stahr

A 3-section Orlyt greenhouse in winter.

COLDHOUSE WINTER-GARDENING

A greenhouse heated by the sun.

By ALDEN STAHR

THE word "hothouse" was formerly used to describe a greenhouse, but it wouldn't do for ours. "Coldhouse" would be a better term, for we have operated it for the past two winters without heat of any kind except for the sun. There is no stove and we don't use fermenting manure to produce heat. The greenhouse is in the middle of an exposed field and we don't cover anything at night or any other time. Yet the greenhouse supplies us with lettuce, kale, parsley and other greens all winter. There are peas, red and green cabbage, carrots and beets growing there right now in January. In fact, the carrots and beets were planted in December and germinated on schedule.

The inside temperature goes below the freezing point almost every night. It has been down to 20 degrees, 15 degrees and even 13 degrees F., the lowest point I have noticed in the morning, without harming the plants. The inside temperature is usually within three degrees of the outside temperature at night.

How do I account for this?

Frankly, it's a mystery to me and the only explanation I have to offer is that the organic method is followed. Last year (1948-49) we took the stove out in the fall because oil was too expensive and in the middle of the winter planted lettuce and parsley in the benches, using topsoil, sand and compost. The seeds

Photo by Alden Stahr

Vegetables grown successfully in winter in a greenhouse heated by the sun—lettuce, peas, cabbage, parsley.

were slow to germinate and grow, but we did have some fresh greens for the table.

Last winter (1949-50) we tore out all the benches, made an eight-inch wall with cinder blocks and filled the planting area this deep with a mixture of half-rotted cow manure picked up from the pasture, half-finished leaf mold, and topsoil. This was all run through a grinding machine and when it went into the greenhouse looked like dark brown humus. We took the precaution this time to sow our seeds in early October so that the plants were large and vigorous by the time cold weather came. The kale was transplanted from the garden.

Between the rows of plants we placed flat stones to soak up the heat by day and give it off by night, as well as to retain moisture, and this, coupled with the fact that the planting bed is slightly below ground level, probably accounts for the protection of the plants against destruction by below-freezing temperatures. Naturally, we would not attempt to grow tropical plants under these conditions.

The greens are picked two or three times a week, and keep right on growing, as we take only the largest leaves. They are watered every week or ten days, if we remember.

The greenhouse is a three-section Orlyt on a cinder-block foundation. Neighbors are growing all-winter greens with even simpler equipment — cold frames and compost — and have done so for years, even in winters when the thermometer dropped well below zero. A friend of ours had heard about the cold greenhouse and came up on a bitter winter day to take a look. She said, "I simply couldn't believe it until I saw it."

As an experiment, I tried covering one section of lettuce with a large window — in other words, this was a cold frame within a greenhouse. The lettuce grew more rapidly with this added protection but somehow its health was altered, for aphids began to appear. To combat this invasion I simply removed the extra glass, and the aphids promptly froze to death. The lettuce, no longer coddled, regained its health.

Fresh greens in winter are a problem to the organic gardener, for he knows that any he buys in the store have been raised with commercial fertilizer and liberally sprayed with poison. We found raising our own to be easy and without cost in our organic "coldhouse."

CHRISTMAS SWEET PEAS

How to grow sweet peas outdoors for Christmas in California.

By CHARLOTTE M. HOAK

CUTHBERTSON sweet peas are one of California's best products. When you stand in the midst of acres of sweet peas at San Juan Bautista and look out over the scintillating mass of color made up by vast blocks of brilliantly colored flowers, you begin to realize what an achievement this remarkable type is. This new variety is named in honor of Frank G. Cuthbertson, whose tireless efforts over a long series of years have produced this floral masterpiece.

Courtesy of Ferry-Morse Seed Co.
Sweet Peas in bloom at Christmas.

They came into existence because they had to fill an insistent demand for a sweet pea which could take the hot, dry climatic weather conditions of California and certain sections of the Southern States. Growers in these areas were anxious to obtain a strain which would meet their strenuous requirements. This big order was turned over to Frank G. Cuthbertson, Vice-President of the Ferry-Morse Seed Company, which has extensive growing grounds at San Juan Bautista and is one of the largest growers of sweet pea seed in America. They began operations about the year 1886. The early flowering Spencer, sometimes known as Winter or Christmas flowering sweet pea, was the first high-water mark in breeding a new type. The color range was wide, but the vines were short and delicate. Next came the summer or late flowering Spencer, which has entirely superseded old grandifloras with very small hooded flower and poor form, according to the present day standards.

All the time that the superior later flowering Spencer was enjoying a wide-spread popularity at San Juan Bautista, the plant breeding department was working to produce a type of sweet pea which could meet hot weather conditions. After many years of careful breeding, selection and testing, in the spring of 1939, they found such a type and introduced it under the name of Spring Flowering Sweet Pea. In 1940, the All-American Council honored the three

original varieties, awarding the Silver Medal to the "Rose Pink," the Bronze Medal to "Blue," and Honorable Mention to "Lavender." Not satisfied by these honors, the breeding work was continued, seeking still greater vigor of vine, larger flowers and a wider color range. In 1946, satisfied with their product, the Cuthbertson made its formal bow to the gardening world and received its name honoring the tireless breeder who had worked so many years to produce his masterpiece. Not satisfied with a national approval, these sweet peas were sent abroad to win international fame by being subjected to the grilling tests of veteran sweet pea specialists. Corline, a vigorous scarlet, received a Certificate of Merit from the Scottish Sweet Pea Society, 1944; Evelyn, a lovely salmon cream pink, received the Silver Medal in 1944 and the Gold Medal in 1945; Lois, clear rose pink on white ground, received the Silver Medal in 1944. No praise is too extravagant to bestow on this superior type of sweet pea and everywhere in the Southwest we plant them exclusively. Frank G. and Evelyn are my favorites, and in a test they ran neck to neck this season.

Sweet peas like these are not difficult to grow when all the hazards are taken out. The separate colors with their endearing given names, from clear pink Carol to clear blue Tommy, are jewels; and the mixture is a brilliant well-balanced one of these named ones, plus the many new shades which are being produced at the sweet pea workshop at San Juan Bautista.

For general outdoor culture select a location where the sweet peas will get the morning and forenoon sun and none in the afternoon. The rows should not be too close to buildings or shaded by overhanging trees or shrubbery. Soil preparation is of greatest importance. Spade the ground as early as possible for the longer it can be left turned over in the rough state, the better. Good deep digging is the great secret of successful sweet pea growing. Good compost added to the soil is far better than commercial fertilizers. If sowing in the open, put seeds about one inch apart and one to one and a half inches deep. Planting in a shallow trench and filling in as the vines grow is common practice. Put twigs up as soon as the plants are three inches high and supply a permanent support as soon as they are six inches high. Wire netting is the usual support supplied. If you are planting Cuthbertson's, be sure your netting is high enough. Personally, I use the "wigwam" method of training up my sweet peas; a tall 2 inch by 2 inch stake forming the center, and stout strings running from 6 inch stakes in the wide ring in which the individual plants are planted. I grow my young plants in 4 inch plant bands and set them out about 5 inches apart. By doing this I avoid all sorts of difficulties, the birds do not trouble me, the slugs and snails do not take their toll and I can select the strongest plants. When I transfer my plants to their permanent locations, I make sure that my seed bed is very firm and there is sufficient water down underneath. The addition of a little Humisite is about all the stimulus these sturdy plants need. They are soon ready to take to their strings and by careful watering they develop rapidly. I use a good mulch of leaf mold or compost. By supporting my vines securely, mulching instead of cultivating, keeping the flowers picked, not overwatering and not using stimulating fertilizers, I avoid the general run of sweet pea diseases.

Courtesy of Ferry-Morse Seed Co.

The Cuthbertson Sweet Pea

CRINUMS FOR OUR GARDENS

Crinum — Ellen L. Bosanquet

Crinums may be jewels in southern gardens.

By MARGARET HASELDINE WALMSLEY

Crinum asiaticum

ONE of the richest jewels in our Southern gardens and at the same time probably the most neglected of all bulbs is the Crinum (pronounced with long i). The word is derived from the Greek which means lily. Botanically it was put in the Lily family for many years, but it is now rightfully classed with the Amaryllis family.

The crinum is a very ancient plant, as it is mentioned in Biblical literature. There is no part of the sub-tropical world without a representative. Some of the crinums, if sufficiently mulched, are able to withstand the winters as far north as Philadelphia and Kentucky with occasional reports of a few farther north, though these are very rare. Many species and hybrids grow well in Texas where they are frozen to the ground each year. Greenhouses all over the country grow many crinums. "Baileys" mentions fifty-one crinums suitable for such culture It is in the gardens of the South, however, where this jewel *should* shine in a brilliant and most heart-warming fashion but it is here that genus Crinum is sadly neglected.

When I came down to Florida twenty-five years ago, I went nearly wild with delight over the so-called "Milk and Wine Lily." Few people did more than tolerate them in the rear of the yard, usually acting a little apologetic over them. They grow so abundantly and thrive so well, even under neglect, that I believe most gardeners felt they were too "easy" to be worth much. It seems to be that way with humans, if anything is easy to get and keep, it is too often despised. I feel that gardeners should take more pains to create a *distinctive* garden and to avoid the monotony of the use of the things everyone else grows. But wonderful plants that have character and individuality, ruggedness of growth and stamina as well as beauty should then be used freely. Plant them and achieve distinction by their varied settings.

There are two main types of crinums. In the first the flowers are salverform (the petals set flat on the tube as in the phlox). The long narrow, erect tubes in different species have petals (limbs) long and narrow; some are lance-shaped; some are white, pure white; some are faintly lined with rose down the center; some purple or wine down the outside of the entire flower and white inside. The number of flowers varies from five to thirty-five in number on the umbel. All are variously and deliciously fragrant.

In the other group the flower has what is called the lily shape. A short or long tube broadens out in the "cup" in varying shapes. In two species the "cup" is quite open or tulip shaped. The lily shaped crinums are far more numerous than the salverform type because it is from the "lily-shaped" *C. Moorei* that the wealth of crinums has descended It is really the "Mother of Crinums."

With us *Moorei* blooms late June or July. The progeny, however, begin quite early and we have a procession of delight until late fall. Naturally, weather conditions in various seasons vary and the blooming time is affected.

These prolific, regal hybrids begin with *C. Cecil Houdyshel* and *C. Louis Bosanquet* vying with each other as to the number of flower stems each can send up. One never ceases marvelling at their fecundity, *C. Cecil Houdyshel,* developed by the fine old bulb hybridizer of that name, in La Verne, California, is so deep a pink that it is now classed as the standard pink crinum. *C. Louis Bosanquet* is not so deep a pink and has a white throat. With good

mineral content in the soil these two attain a rich luminosity.

The pure white hybrid, White Queen, usually thought to be one of Burbank's hybrids, is indeed distinctive. The long tube is topped by recurved petals. If in too much sun there is a tendency to wilting, the sheer weight of the many heavy flowers causes them to hang or droop, which displeases some gardeners. There are so many flowers, each lasting but one day, followed by the buds standing ready to take their day of beauty, I think this criticism is like quarrelling with gifts of great price.

The wonderful old hybrid *C. powelli alba,* known as the Easter lily crinum is due to start even earlier than any Easter can come. It is so floriferous that no matter how late Easter may come there will still be Powelli alba and much later, too. They much resemble the real lily, also. This crinum is a fine adaptable plant, growing well in almost any location. It reproduces abundantly and flowers frequently and profusely. It is a variant of the *C. powelli* which is pale pink, a nice crinum, but with none of the outstanding qualities in flower or reproduction.

Another pale pink daughter of *Moorei* is C. J. HARVEY. It is apparently a temperamental crinum. Some growers find it either a shy bloomer or it has never flowered for them, while others find it a rank grower with abundant flowers in a short season.

Strangely enough, although far the largest number of hybrids are in the second, the lily-shaped group, it is from the first, the salverform group, that most of those come which may bloom at any time of the year, with two notable exceptions. The glorious *C. asiaticum* carries up to thirty-six fragrant white flowers, with narrow linear petals, crowning the great mass of long, strap-shaped, dark green leaves. It has almost the character of a shrub, being so massive. The bulb itself is often a foot in diameter, the digging of it being a real chore. The length of leaves will shame a yardstick and the umbels of flowers are carried well above my head in an old plant, and I am more than five feet five.

Crinum *Amabile* (and *C. angustifolium,* rarely seen) vie with *C. asiaticum* in size and may be found in flower any month in the year. It would need a color film to do justice to the true quality of dramatic beauty of the "Milk and Wine" lilies, as these queenly bulbs are commonly known. They are rich purple on the outside of flowers and stem. Inside a milk white gives a dramatic contrast. The flower cluster is so heavy with its lovely burden that it always has to be tied up or it wastes its beauty on the ground. I use one of the long narrow leaves for this purpose.

I mentioned two exceptions, earlier. The first of these is the *C. giganteum.* This specific name is not at all descriptive, as neither the bulb, nor the plant itself, nor the flowers are large, compared to other crinums. The flowers are pure white with an open cup or tulip shape, carrying black anthers. While not free flowering, yet two flower stems will be put out two or three times during the year. This lovely crinum does not want much sun; a good leafy shade and plenty of moisture and humus, supply its wants.

The other exception is a garden hybrid, which from its gray-green foliage clearly indicates that its parent must be *C. lonifolium.* This plant is one of the most prized crinums. The bulb is surprisingly large but the foliage reaches a height of only three feet. The flowers, eight to ten in each umbel, are delicate pink with flushed rose keeling. The edges of the petals are definitely wavy. The two flower stalks arise every six weeks or two months and every time I discover another I exclaim to myself, "How *do* you do it?" It is the most floriferous of

J. Horace McFarland Co.

Hybrid crinum

J. Horace McFarland Co.

Crinum Crassifolium

any crinum I know. It is a very slow reproducer. It was ten years from my planting of the bulb until I had a small offset. The digging of this crinum was epic. For some years I had longed for this crinum "over the fence." Finally a friend who was a neighbor of the owner, obtained permission for us to dig. It was in a thick mat of native yellow canna bulbs. The cavity we had to make in order to get our two bulbs was large enough to accommodate a kitchen range. We earned them!

In his book on Florida vegetation, Dr. Henry Nehrling speaks of the wonderful effect of a large bed of flowering *C. giganteum var.* "Christopher's Lily." Their mass of white flowers was so ethereally lovely in the moonlight he could scarcely tear himself away to let the beauty be squandered unobserved. This variety is a summer bloomer, liking shade and moisture. I believe it is now called *C. bulbospermum.*

A Florida crinum is *C. americanum,* often known as "swamp lily." It belongs in the first group with salverform flowers, broad lanceolate petals (limbs). Once you have seen this flower in the wild you have received a gift that nothing can ever erase from your memory. The flower is not over three inches across, and there are five flowers in the umbel. In our gardens it is not too dependable a bloomer, but when it does favor us, how we do treasure it! It has a sister species with faint pink flush, another having the flower stem stained purple. All multiply by stolons, they do not "stay put."

The name "Milk and Wine Lily" is commonly applied to one crinum, *C. amabile,* though properly it belongs to a large number which have the "wine" in varying degree from a faint stripe or tinting, to the full wine outside the entire flower. There is a multitude of these "milk and wine" crinums. There are many garden hybrids which the collector is turning up, and one can only give them a pet name or designation, no one knows the name. There is endless confusion in the nomenclature at best and the numerous garden hybrids do not help clarify the situation.

Now, as though capping the climax of imagined loveliness, standing alone in its color, unexcelled for vigor, for character, for beauty, and for reproductivity, is the hybrid *Mme. Ellen Bosanquet.* This crinum is a memorial perpetuating the name of the wife of the great hybridizer. It raises its umbel of eighteen to twenty flowers of luminous raspberry with an enchanting fragrance, the stalks marching two by two from mid-May through August. This year is the first I have known it to bloom in early April. It is most abundant with its flowers and in reproduction. It is well to divide the clump every four years at most, before it becomes a tangled mass of bulbs. This is in no sense a jumbo crinum, though of good size. It is most adaptable and anything but demanding in its wants.

One bigeneric hybrid of great beauty and charm, entirely unpredictable in its flowering, is the lovely old Burbank hybrid formerly called Amarcrinum, from its parentage, the Crinum and the *Amaryllis belladonna.* It is now known as Crinodonna. Its petals are quite fluted, pale pink and most endearing in form, fragrance and character. This is a collector's item.

Crinums reproduce sexually by seeds and asexually by bulb offsets. There is great variation in the rate of offsets. Some multiply freely, others may be years before sending any offsets. A little assistance to help Mother Nature can be given by digging down and cutting out a small wedge at the base of the bulb, being sure to obtain a piece of the "plate" at the base of the bulb Also just cutting through into the bulb at the base may force action. In any case treat the wedge as a tender cutting until it makes a bulb. Many crinums refuse to set seed even when hand pollinated, so that seed is only obtainable from species and a few hybrids when pollinated. The miracle of the germination of a crinum seed is like nothing else in the seed world I have ever observed. The funny, fleshy, bulb-like seeds weigh to the ground the old flower stalk, which slowly disintegrates, severing their tie to their Mother. They lie nestling in the leaf mold, appearing like just another bit of rotting vegetation. One day a tiny leaf is discovered coming up from the side of that little husk. Digging down, one finds that a tiny root has started out and down from the side,

(*Continued on page 57*)

MARIANO MONTEALEGRE

By B. H. ROE

As Sir Albert Howard himself said in his famous book *An Agricultural Testament,* it was Mr. Montealegre who introduced into the Western Hemisphere the now well-known Indore Process for the preparation of organic fertilizers, employing therein the waste and garbage from the farms and cities.

A lucky coincidence, a note of little importance in the West India Committee Journal, prompted Mr. Montealegre to write to Sir Albert inquiring about the new process. His reply was not long in coming, and with it a copy of his second lecture given before the Royal Society of Arts on November 22, 1935. Thus it fell to the lot of the *Revista Del Instituto De Defensa Del Cafe De Costa Rica,* of which Mr. Montealegre is Director, to be the first publication to carry to the peoples of the Spanish-speaking countries, in March of 1937, the new agricultural gospel, and the second to translate it into a foreign language, the first having been the then well-known German publication *Der Tropenflanzer,* which did so a few months previously.

What was it that caused Mr. Montealegre to show such unusual enthusiasm regarding this new process? Here is how he explains it in his article "The Evolution of Composting in Central America" in *Organic Gardening,* Vol. II, No. 3, of September 1947:

"I had been in the coffee business from early youth; in fact I have been in since my return from Downton College of Agriculture in England, and for thirty years was Superintendent of the largest coffee concern in Costa Rica — the Lindo Brothers' Coffee Plantations.

"Being a graduate of a College of Agriculture, I was naturally NPK-minded; but to my sorrow, and after many trials, consultations, soil analyses and combinations, I was convinced that chemicals and coffee did not seem to agree, and I began trying fish manure, which I obtained from The Humber Fishing and Fish Manure Co., of Hull, England. The difference was so amazing that I applied for the agency, which I worked with great success until the war stopped supplies. The results were really astonishing, not only with coffee but with sugar-cane, tobacco, and with all other crops.

"So when I had the privilege of establishing a connection with Sir Albert Howard, I was already convinced of the failure of chemicals in the tropics and of the necessity of using organic manures in their stead, but was entirely at a loss as to procedure. The old-fashioned compost heap (not Sir Albert Howard's kind) was so tedious, took so long to ripen, and was so unsatisfactory in the end that I tried it, to abandon it soon after. I had also tried the burying of fresh city garbage around coffee plants, and although the results were good I had to abandon the idea on account of bad odors, swarms of flies and the unburying of the materials by poultry and other animals. . . ."

Soon after the circulation of the March 1937 issue of *Revista Del Instituto de Defensa del Cafe de Costa Rica,* letters commenced to come in from all parts of Latin America in which that publication is extensively read, with requests for information regarding the new process. This prompted Mr. Montealegre, who had recently taken over the position of Director of the Institute for the Defense of Coffee, to devote a good part of the magazine to the spreading of the new idea.

In January, 1939, a special issue was published under the heading of *En Busca de Humus* (In Quest of Humus) in which, in addition to a description of the process, the results obtained during the past eight years were made known.

Among the first to become interested in the new process was the Agricultural Society of the Republic of Colombia, which published an interesting pamphlet entitled *El Estiercol,* in which are recorded the results obtained during a number of years by Mr. L. J. Carvajalino Jacome, an Agricultural Expert, and in 1946 the National Society of Agriculture of Chile published an excellent translation of *An Agricultural Testament,* the first edition of which was sold out within a few weeks.

It was, however, in Central America (El Salvador and Guatemala) where the idea was first put into actual practice: in Guatemala by Don Pedro Cofiño, some nine years ago, on his farm "Retana" in Antigua, and in El Salvador with the installation of the "Vital-

Humus" factory, the property of Messrs. Araujo & Co., at Santa Ana, and this is what Mr. Montealegre tells us in *Organic Gardening*, Vol. II, No. 3, pages 33/34:

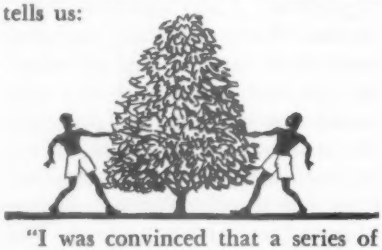
"The first coffee planter to put the process into real practice was, no doubt, Don Pedro Cofiño of Antigua, Guatemala, about eight years ago. I had the privilege of visiting his plantation in October last year, and was really astounded by the results revealed, not so much in the actual condition of his plantations, which are perfectly healthy and producing huge crops, but in visiting his neighbors' plantations on the same soil and with identical climatic conditions, which were full of disease and producing less than half as much . . . .

"On my way to Guatemala I stopped for a few days in the Republic of El Salvador, where I found the same enthusiasm. Quite a few planters and gardeners have started producing compost on their own properties, but the outstanding fact in El Salvador is that they are already producing it on a commercial scale.

"My principal reason for this trip was an invitation from Messrs. Araujo & Co. to visit their Vital-Humus plant at Santa Ana. I must confess that I was a little dubious about it and felt somewhat nervous, for having been a factor in their going to the heavy expense of putting up the factory. But I felt relieved the moment I entered it. The people have done a really wonderful job. When completed, the plant will have 225 brick-laid pits 10 metres* x 2.75 x 0.90. When I visited the plant three months ago they had only fifty pits in operation; they were exceptionally well aerated and their daily production was already between 12 and 13 tons, with orders ahead for more than 600 tons. They claim that they are using only about one-fifth of the town wastes and feel confident that even when in full operation the demand will be greater than the supply . . ."

Regarding Costa Rica, Mr. Montealegre says: "The conservatism of the men of the soil is universal and Costa Rica is no exception. In this particular case the handicap was even greater for, as we say in Spanish, 'No man is a prophet in his own land,' and while the new idea was taking hold in all the neighboring countries it was laughed at in Costa Rica. Six years went by and no real progress was made . . . ."

In 1943 Mr. Montealegre was appointed Secretary of Agriculture, and decided on a change of policy to further the scheme. He called in Mr. Vance Rogers, Chief of Party of the Institute of Inter-American Affairs, Food Production Division (an agency of the U. S. Government which collaborates with local Governments in Latin America for the improvement of Agriculture) and explained the situation, and this is what he tells us:



"I was convinced that a series of experiments conducted and recommended by the Institute would work a miracle. Mr. Rogers, after studying the process, offered the collaboration of his organization and the experiments were undertaken under the direction of Mr. G. C. Kincaid, a very capable Agronomist of the institution.

"Success was instantaneous. No sooner had the results of the experiment been published than inquiries began to pour in from planters and gardeners. The miracle was twofold: it not only aroused the interest of the cultivators but also, and no doubt even more important, made the Institute of Inter-American Affairs our best helper in propagation of the new idea. I must state here, and I do so with real pleasure, that all the credit for what has been done since 1943 belongs to the staff of the Institute of Inter-American Affairs, for not only Mr. Rogers and Mr. Kincaid, but Mr. Octavius J. Schofield and Don Jorge Leon also became convinced supporters of the cause and have since then given great importance to the furtherance of composting by the Indore Process in all their work with planters, farmers and gardeners throughout the country. . . ."

Interest has continued to increase, and the Institute of Agricultural Sciences, at Turrialba, has taken up the matter, in accordance with their Project No. 42, their reasons for carrying out the study being as follows:

"In accordance with the conditions and topography of tropical America, its soil is the victim of the erosion caused by water which year in and year out carries away millions of tons of vegetable matter to the rivers and later to the sea without its being recovered even in part. On the other hand, there are larger areas which have been under cultivation for many decades and which have ceased to be fertile, owing to the absence of restoration of the soil.

"In tropical regions the ever-present heat and humidity and the intense solar radiation permit a biochemical action of great vitality which is the cause of the profound physical as well as chemico-biological changes. These changes produce, as a result, considerable instability of the organic matter present, which leaves the soil in such condition that it is easily washed away by the torrential rains characteristic of these latitudes.

"Considering the effects of organic matter not only on agricultural production but also as an essential factor in the health and success of crops, of domestic animals and especially of man and, lastly, considering this matter from the viewpoint of conservation of the fertility of the soil subjected to permanent systems of cultivation, it is most necessary to look for sources of combinations of organic substances which may be incorporated into the tillable lands.

"The present plan will be based on the Indore Process which has given such good results in all parts of the world in which it has been used. This is a very simple process

* One metre equals 39.37 inches.

and of quick operation, in which is followed the natural process which takes place daily in the forests.

"Very little is as yet known regarding the reaction of tropical soil to the treatment specified in the final portion of the present plan. As the relative value of organic fertilizers, as compared with artificial fertilizers, has become a problem of great importance which has given rise to much controversy, it is now necessary to undertake studies based on regional investigations which may later make possible the giving of practical advice to planters. . . ."

The fact that the Institute of Agricultural Sciences, which is looked upon as their own by the twenty-one republics of America, has interested itself in the new process and is preparing to make profound study which it contemplates, gives a clear idea of the work of divulgation carried out by means of the *Revista del Instituto de Defensa del Cafe de Costa Rica* and of the interest which new ideas have awakened throughout the Continent.

On assuming the office of Director of the Institute for the Defense of Coffee, Mr. Montealegre issued instructions for an inspection of the coffee farms of the country, for the purpose of ascertaining the reasons for the low production, and it having been discovered that this was due mainly to the bare spots in the areas under cultivation, he decided to have extensive nurseries planted in various regions, for account of the Institute, so that the young trees might be sold to planters at cost. The success of this measure, after having been in practice for a period of nine years, has served to prove Mr. Montealegre's foresight, inasmuch as the past and present coffee crops will undoubtedly prove to be the largest obtained in the history of the country.

Mr. Montealegre was born at San José, Costa Rica, on November 26, 1876. After graduating from High School he was sent to Europe to continue his studies, and in 1893 took his B. Sc. Degree at Geneva, Switzerland, having in 1896 graduated in Agricultural Sciences at Downton College, England. He returned to Costa Rica the following year and started to work on his father's farms, and later on those of the firm of Von Schroeter, having also for a time acted as adviser to the firm of Shlubach Sapper, of Guatamala. Subsequently, and for a period of some thirty years, he occupied the position of Superintendent of Agriculture for the firm of Lindo Brothers, of Costa Rica.

The period prescribed by the Law which created the Department of Agriculture and made it an adjunct of the Department of Public Works having expired, the former became independent and Mr. Montealegre

was immediately called to the position of Secretary of Agriculture. His experience, his knowledge and, above all, his profound longing for the betterment of the agricultural systems employed in Costa Rica could thus be given timely application. The department was created, separated and should function on its own. The wishes of the great majority of Costa Ricans had therefore been expressed in favor of the creating of the department, and the natives of the country being more agriculturists than anything else, it seemed strange that the State should not previously have made any effort in that direction. But at the commencement serious economic difficulties had to be faced, and it was up to the head of the new department to overcome them as best he could. No office space, no furniture nor, strictly speaking, was even help available. There was, however, the National School of Agriculture, and from this was drawn, as a first step, those who should perform the most pressing duties.

Thanks to the good will enjoyed by Mr. Montealegre as Director of the Institute for the Defense of Coffee, he obtained authority to install the offices of the department in the assembly room of the Institute, and with furniture provided by the Institute, Mr. Montealegre commenced the organization of his new department. The result was that, thanks to the support and confidence of the President of the Republic, when the latter's term of office expired on May 7, 1944, he left the Department of Agriculture properly installed in suitable offices, with the Services of Statistics of Production, of Colonization and Distribution of Lands, Control of the Locust, Apiculture — attached to the National School created for that purpose — and of Regional Centers of Agriculture, a most valuable contribution to the real progress of the country, its organization carrying from the very center of official agriculture to the most remote rural district constructive agricultural action. In addition, the services then existing in the Department of Agriculture received attention. The deciding upon a policy of help for every problem which, for logical reasons, proved to be new and always troublesome, devolved upon Mr. Montealegre, whose proven experience, whose astonishing calmness and whose sense of leadership were fully established by the time he relinquished the office. From the Report published by him on leaving the Department can be observed a patriotic anxiety, a love of agriculture which if not new in Mr. Montealegre, still stands out with greater force.

The campaign against the Locust was a complete success, as the plague was reduced in certain parts of the Province of Guanacaste; and the purchase of lands in fulfillment of the laws by which they were allotted to peasants who were in need of them, proved the understanding which the Secretary of Agriculture had of the true situation, and also established the extreme integrity with which the matter was handled by him.

The creation of the National School of Apiculture and the work

of the Apicultural Section, which saved the apiaries that had been completely abandoned as a result of the War, proves not only his interest in a branch of agricultural industry of such importance, but also his foresight of its economic future, thus offering to the country's economy an item which had been marked off. The organization of the Regional Centers of Agriculture speaks clearly of his profound knowledge of our peasant and of his accurate estimation of the means for forcing him out of routine and bringing him into line with scientific agriculture.

Of lesser importance, but of equal value within the general understanding of our agricultural economy, were: the Plant for the kiln-drying of corn at Guacimo, put up by the Institute of Inter-American Affairs but the basic idea of which emanated from the Ministry of Agriculture; the Agricultural Farm at Liberia, Guanacaste, a semi-desert where it was proven to planters, in a struggle with lack of water for irrigation and with the indolence of those who foresaw failure, that it was possible and necessary to grow vegetables, fruits, selected grain, flowers and everything that constitutes horticulture in temperate regions; the garden and experimental nursery at the Ochomogo Heights, Cartago, which became the recreation spot of the most important planters of the Central Plateau.

Owing to the scant production of corn in the country, an area of land was acquired in the vicinity of the drying plant at Guacimo for the cultivation of this crop, as prior to the installation of the plant and owing to the continuous rainfall in the district, not less than 60 per cent of the crop was lost each year. But ever since the dryers commenced to operate, the entire 60 per cent has been saved each year, and it has at no time become necessary to undertake the cultivation of the area acquired for that purpose.

The foregoing thus constituted the outer ring of a vast and well-studied plan for promoting, with the means available and under the unique conditions existing, the technical agriculturization of Costa Rica.

And lastly, we may mention that Mr. Montealegre formed the principal channel through which the Inter-American Institute of Agricultural Sciences established its headquarters

in Costa Rica, and to his tact, his charming manner and his prestige were due the very cordial relations which have distinguished from the commencement the joint work of that admirable Institution and the Official Sections of Agriculture of the Republic of Costa Rica.

Even as a young man, Mr. Montealegre used to record the results of his experience with the cultivation of coffee, and in 1902 published his first study *La Poda del Cafeto* (Pruning the Coffee Tree), which was translated into the English and French languages. This was the first attempt at the scientific pruning of coffee, and it is now known as *Poda de Costa Rica* (Costa Rican Pruning) which is, with some variations, the method still customarily employed on the plantations of the country.

The first study was followed by many others, among which may be mentioned: *Enfermedades del Café* (Diseases of Coffee), *La Maya o Hilo Blanco en las Raices* (White Rot of the Roots), *Plantación al Tresbolillo* (Quincunx Planting), *La Defoliación Prematura del Cafeto, Sus Causas y Efectos* (Premature Defoliation of the Coffee tree, Its Causes and Effects), *El Dimorfismo de las Ramas del Cafeto* (Dimorphism of the Branches of the Coffee Tree) *La Apicultura como Complemento de la Caficultura* (Apiculture as a Complement to Coffee Culture), *De los Almacigos* (Coffee Nurseries and How to Make Them), *Del Papel de las Leguminosas en el Mantenimiento de la Fertilidad de Las Tierras* (Legumes in the Maintenance of Fertility on Coffee Plantations), *La Fermentación del Café y su Posible Influencia Sobre la Calidad* (The Fermentation of Coffee and its Possible Influence on the Quality), *El Café, Piedra Angular de la Estructura Económica, Politica y Social de Costa Rica* (Coffee, the Corner Stone of the Economical, Political and Social Structure of Costa Rica), and many others which appear in the *Revista del Instituto de Defensa del Café de Costa Rica.*

The Soil and Health Foundation

The Soil and Health Foundation has been organized and incorporated in the Courts of the State of Pennsylvania for the following general purposes:

(a) To promote, foster and encourage the use of humus and other organic matter in order to maintain and improve soil fertility, to prevent soil erosion, and to improve the health of man.

(b) To conduct, engage in, foster and encourage scientific research and study and teaching, training, informing and educating the public on and concerning the soil, foods and health of man—and their relation to each other.

(c) To study the effects of organic and artificial fertilizers on soil, plants, animals and man.

(d) In order to accomplish the foregoing purposes to establish, use, maintain and operate farms, schools, laboratories, experimental stations, publishing houses and all other appropriate agencies, means and instruments.

Through its publications, the Foundation will publicize the results of its investigations and endeavor to educate farmers, gardeners, and the public in general in cultural practices which will insure the better conservation of our soils and the public health.

All who make contributions to this Foundation become members, regardless of the amount given. A contribution continues the membership for a year. Will all members who have not done so, send their contributions for another year to the Secretary, Soil and Health Foundation, Emmaus, Pa.

Cabbage leaves and cabbage heads.

DON'T WASTE THE BEST

Do not discard the most nutritious parts of food plants.

By ARCHER P. WHALLON

THE war time Victory Garden served well the best interests of home loving Americans when it gave them an initiation into the pleasures and profit of vegetable gardening, a practice which should be continued as a recreational adjunct of wholesome and self-sufficient living. But it is still true that many American gardeners fail of full realization of their garden's possibilities through lack of knowledge of some practices well known in other lands.

Americans will hardly adopt the practices of drudging Oriental or European peasantry and spend their evenings in such work as peeling squash and pumpkin seeds preparatory to crushing them to make cooking oil, but the European use of the false or male flowers of these garden vines as food is a simple matter and should be better known. These big yellow blossoms serve well as ingredients of salads and for garnishing, but they are of more value as a fried vegetable. Cut off the blossom, roll in flour and fry a light brown. The Greeks, Italians, and other southern European peoples use the flowers of the Cocozelle or vegetable marrow type squash, which is very free flowering, but other varieties would serve as well.

It would seem, too, that these large flowers would serve as ready-made containers, convenient for the preparation of substitutes for or modifications of, "hot tamales" to better advantage than the inedible corn husks.

A standard recipe for tamales is as follows:

Make a thick cornmeal mush, well cooked, and spread on green corn husks, making a layer about one-half inch thick. Chop cooked meat fine, chicken or veal preferred, season well and moisten slightly. Spread a layer of this over the mush and roll it up like a jelly roll in the corn husk. Tie with strips of the corn husk, and put the tamales in a pan close together to "set," so that they will hold their shape. They may either be steamed until heated through before

serving, or put in a shallow pan and simmered until heated in the soup stock made from the trimmings of the meat.

A food product, somewhat on the same plan, but using edible leaves, known as Syrian or Armenian sarmas, is a common dish with these peoples. The Syrians use a mixture of rice, meat, and garlic, wrapped in grape leaves, but of course, the mixture could be changed as desired and to make use of available materials. And by the way, the use of young grape leaves, boiled like spinach, is common throughout the Near East, even being a commercial canning industry, and imported canned grape leaves can be purchased of Greek grocers in some American towns. Of course, any large edible leaf, cabbage, Chinese cabbage, large Elephant Ear mustard, and the like, can be used in making these sarmas. It is advisable to wilt the leaves with boiling water, so that they will not be brittle and can be readily rolled. In using an uncooked ingredient, such as rice, which swells, the leaves should not be rolled too tightly. Put some leaves in the bottom of the kettle to prevent sticking, and the boiling should not be too violent.

I once read in a seed catalog published at Lyon, France, that the small ears of sweet corn, before the kernels were well formed or the cob hard, are pickled like cucumbers, but this would seem an extravagant way of getting pickles. However, some of the branching, multiple-eared varieties might serve to advantage. Also, many foreign peoples use small green summer squashes for pickles and small canned marrow squashes are sold by Greek and Italian grocers.

I have not tried the following method of fruit and vegetable conservation, but as it is cheap and simple, and its efficiency seems plausible, it might be worth a trial. This, preservation by stratification in powdered hydrated or agricultural lime, is in substance quoted from *Le Petit Jardin,* which in turn quoted the original by a Belgian horticulturist, M. Monclar, in *Belgique Horticole.* It consists of merely packing fruits or vegetables in a box of powdered lime. They should be separated an inch and a half or more from each other with three inches of lime on the bottom, top and around the sides of the container, the idea being to have the lime give adequate isolation from the air. Of course, the box should be kept from freezing. Fruits should be as perfect as possible, free from all blemishes, and picked a little before maturity. It is stated that the lime does not attack in any way the skin of the fruit subject to prolonged contact, nor in any way affect flavor. It is stated that grapes were kept from the thirteenth of September until the second of the following May; quinces, apples and pears, for approximately the same period. Onions were preserved from the twenty-second of August until the second of May. Tomatoes, incompletely ripe were kept from the twenty-second of October, until the fifteenth of January, and beets and carrots, taken from the lime in May, seemed as freshly pulled.

This practice may well be worth trial, and it might be well to note that some centuries ago, long before the invention of canning, foods were preserved in powdered charcoal. The early English navigators, including Sir Francis Drake, who rounded the horn and visited the site of San Francisco, carried meat through voyages of years in tropic climates by this simple expedient.

Woodman Spare the Leaves!

THERE are many uses for leaves on any home grounds no matter whether they are diminutive or formal. There are always some plants and young shrubs that need protection at certain seasons. Freshly raked leaves provide this in an ideal way. And as these leaves begin to disintegrate they produce the sort of fertilizer that promotes healthy growth without any injurious undue stimulation. They are an ideal source of humus.

If there is no place to use them as soon as raked, stack them in a convenient spot adding an occasional thin layer of soil and some activator and leave them to be spaded under later. The resulting soil will be friable and richly fertile without the disagreeable odor of animal fertilizer.

Low spots in the garden or lawn may be successfully corrected by spading under as much fertilizer of this kind as is needed. In the case of the lawn cut the sod with a sharp spade, fold it back gently, work the leaf compost into the soil thoroughly until the desired level is attained, fold the sod back, pack freely and water. The satisfaction from a job like this will be felt every time the mower rolls over it.

Leaves provide splendid winter protection for the perennials. In the spring the cover mixes with soil around the plants giving it an improved texture and providing increased humus that makes for easier cultivation and more satisfying growth.

Leaves may be used to cover the strawberries if some care is taken to prevent them from forming a heavy mat that will smother the plants. Spread some coarse stalks like corn stalks or zinnias or dried tomato plants; there is always something in the fall garden that is suitable. And here also the leaf cover works down around the plants to keep the fruit and vines out of the dirt.

Shrubs, young trees and larger bushes will be benefited by a slight banking of leaves immediately next the trunks. They keep down grass and weeds and hold the moisture that feeds the small roots.

WINTERIZE YOUR PLANTS

Mulching plants is one of nature's laws.

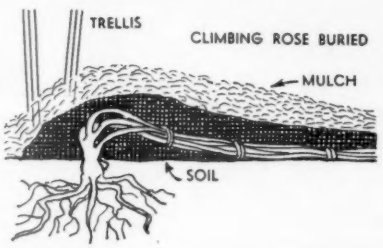
By WILLIAM H. EYSTER, Ph.D.

SINCE many if not most of the plants in your garden and home grounds are natives of other regions and other countries, some winter protection is necessary for many of them. In growing plants every effort and every cultural practice should be used which will insure early growth and proper hardening of the twigs before cold weather sets in. This is especially true of the everblooming roses, and other plants which are natives of a warmer climate. Unless the autumn is especially dry, watering should be discontinued early enough to permit proper hardening of the new growths. In a dry autumn, the wood ripens well and yet, if it should be unseasonably dry just after the first heavy killing frost, good watering is advisable to get the normal amount of sap in the plants. Often evergreens planted near buildings, where they get rainfall from one direction, often receive serious winter damage. If such plantings are well soaked before the ground freezes, there is seldom much damage. During most years, foundation plantings need watering as a preparation for winter.

Snow is one of the best winter protective mulches, but over a large part of this country it cannot be depended on to give continuous protection during all the really cold months. Frequently a mid-winter thaw is followed by a cold spell and frost sinks deep into the ground. But snow is for us an object lesson from the great book of nature.

Mulches and Mulching

By far the best kind of winter protection for plants is a mulch which must vary according to the kind of plant. With a suitable mulch on the surface, the ground freezes little or not at all and the roots of plants and the soil organisms remain reasonably active and can start functioning in the early spring when bright, sunny and windy days, followed by sharp frosts at night, have a drying effect on vegetation. Under such conditions, many choice coniferous and broad-leaved evergreens lose so much water through their leaves that cannot be replaced from the frozen soil that they turn brown and often die as a result. No method of winter



protection, however elaborate, can equal the value of a proper mulch on the ground. This prevents the ground from freezing and keeps the roots active so that the water needed by the plants in winter can be absorbed by the roots and sent up the stem to the leaves.

Mulching your biennial and perennial flowers, shrubs, and trees is the last and most important job of the year so far as the garden and home grounds are concerned. It may make the difference between beautiful flowers and healthy shrubs and trees as compared with flowers that are badly frozen and sickly and insect-ravaged shrubs and trees. If you value your plants, you cannot afford the risk of winter damage.

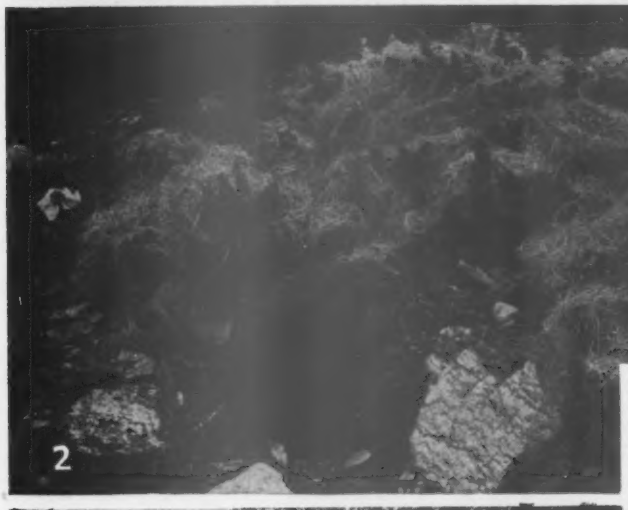
Prepare your mulching material during the autumn months, but do not apply it until the ground has been frozen slightly. If snow falls in the meantime, mulch over the snow. This will insure complete dormancy of the plants under the mulch. Do not be in a hurry in the spring to remove the mulch. Mulches should be removed gradually and only as plants have begun the renewal of growth in spring.

The materials that are good for mulches are varied and usually abundant. In the autumn nature provides plant residues in such vast amounts that there are mulching materials for all who know their value and take the time and trouble to use them. Think of the leaves of the deciduous shrubs and trees! There are thousands of tons of them. They are nature's offering to us as mulching materials. Then there are such garden residues as tomato vines, corn stalks, pea vines, beet tops, and the many other garden wastes. There are numerous wastes from mills and other industries which vary in different parts of the country, such as ground corncobs, tobacco stems, brewery wastes, gin wastes, shredded bark, excelsior, sawdust, and the shells of peanuts, almonds and other nuts.

Burying Plants for the Winter

The ground, if covered with a mulch, maintains a rather uniform temperature during the winter and seldom freezes. Many plants and especially our herbaceous perennials withdraw to such underground parts as bulbs, rhizomes, other modified stems, and fleshy roots for the winter. Advantage may be taken of this

(*Continued on page* 34)



WINTER PROTECTION F

1. Foxgloves being covered with loose mulch.
2. Excelsior is a good winter cover for Daphne.
3. Azaleas being mulched with leaves.
4. Azaleas mulched with hemlock boughs.
5. Boxwood hedge covered with burlap.
6. Rhododendrons protected with burlap windbreaks.

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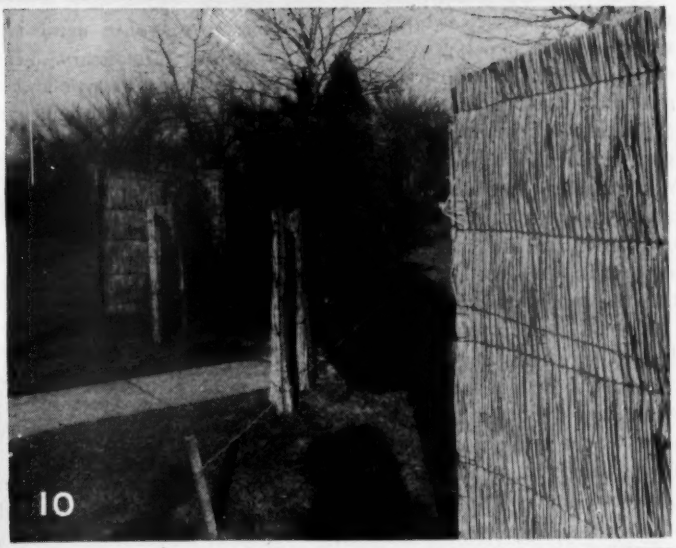
7. Perennial bed protected with oak leaves and hemlock boughs.
8. Evergreens protected from winter winds with matting.
9. Shrubs wrapped with straw for the winter.
10. Windbreaks of matting for evergreens.
11. Gerberas protected with paper-wrapped nail kegs.

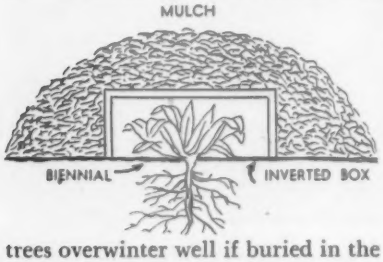


Photos by Horace McFarland

Winter Plant Protection

(*Continued from page 31*)

method of over-wintering plants whenever practicable. Climbing roses can be protected most satisfactorily by laying them on the ground and covering them with about 3 inches of soil. As soon as the soil has frozen, cover the soil over the roses with a winter mulch. Deciduous shrubs and



trees overwinter well if buried in the soil. A fig tree which grows in Allentown, Pa. is buried each fall and resurrected each spring. Shortly after the tree is brought above ground in spring, the first blossoms appear while a second set of flowers appear a month or so later. The burying of this fig tree for the winter is described in the April, 1948 issue of the *Organic Gardening* magazine.

Hybrid tea roses are partially buried by heaping the ground around the base of the plant to form a mound a foot or more high. As soon as the soil in this mound has frozen slightly, a mulch or plant materials should be put over it.

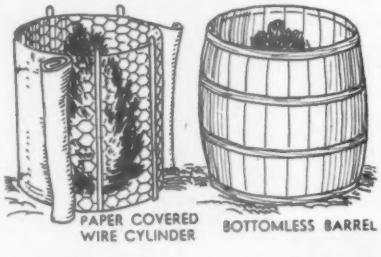
Covering Plants with Insulating Materials

Some plants and especially the biennials which have a rosette of leaves near the surface of the ground must be protected during the winter, but cannot endure a mulch which packs and thus excludes a proper supply of oxygen. As examples of such plants may be mentioned delphinium, fox-glove, canterbury bells, violas, and pansies. A suitable protection for such plants consists of an inverted box large enough to cover the plant with six or eight inches of plant mulch over and around the box. If leaves are used for mulching, wire screening over them, weighted down with stones or bricks, will keep the leaves in place.

Most plants are sufficiently protected if covered with a layer of autumnal leaves, especially dry oak leaves which are less apt to pack into a tight, compact layer. Of course, any leaves that are available may be used. Boughs of hemlock, spruce, or other coniferous trees may be used as a winter protective cover of biennial and perennial herbaceous plants. Any material which will not pack may be used for a winter mulch as salt hay, straw, excelsior, wood shavings, rock or mineral wool.

Protection Against Bright Sun and Biting Winds

When southern plants are grown near or beyond their northern limits, some protection against wind and weather is necessary. Magnolias of the soulangeana type and sweet cherries should have their trunks wrap-



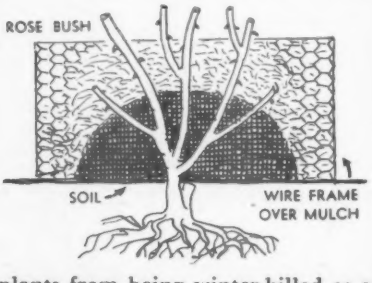
ped with burlap, to prevent trunk damage by cracking and sunscald. The same may be said for English walnuts and other trees which tend to have a succulent bark. Magnolias in such northern localities are far more successful if grown as large shrubs with branches near the ground rather than as trees. Sweet cherries should be allowed to branch low to begin with, even if, when the trees get larger, a few of the lower limbs have to be removed.

Tender shrubs can be protected by wrapping them with rye straw. This protective covering should not be applied until the weather has become quite cold and the plants are completely dormant. For protecting such plants as boxwood and rhododendron against the biting winter winds, burlap screens or covers may be used. This breaks the force of the wind and still permits sufficient air to keep the plants in a healthy condition. Windbreaks may also be made of other materials as bamboo or fiber matting, boards, poultry wire covered with heavy paper, a barrel with both ends removed, and hedges of such hardy plants as spruce or hemlock. Applying these protective coverings to the tops of tender plants does not make unnecessary mulching the soil to keep the ground from freezing in winter. These top coverings are to be regarded as additional protective measures to be taken after the ground has been well mulched for the winter.

Foundation plantings also need to be protected against snow slides from the roofs of buildings, against the formation of ice on the plants from water which drips from the roof, and against falling ice which accumulates on buildings and later falls to the ground.

Winter Protection Briefly Restated

The secret of winter protection is in the soil. Cover the soil with any available and suitable mulch which will prevent the ground from freezing and keep the roots of plants and soil organisms more or less active all winter. Under these conditions, the evergreen plants will absorb enough water from the soil to compensate for what is lost by evaporation from the leaves and prevent the



plants from being winter-killed as a result of excessive loss of water. With a good winter mulch on the soil, all except the most tender plants can withstand the winter conditions without serious damage. Any protection of the part of the plant above ground must be in addition to the mulch. Various methods and materials for such top protection are described and illustrated in this article.

Floral Arrangements

By ANN ANDREWS

November Dried Arrangements

WHEN the fall season appears we have a desire to bring the riches of the season into our homes to be enjoyed in its entirety. New ideas are born with the new season.

Arrangements run the gamut of light greens to weathered grey tones in the cool colors. The warm pinks can be worked up to deep reds of sumac and rich browns of dried leaves.

Hugelmeyer

Swamp weeds such as teasel, cattail, sedge combined with ostrich fern, sumac, and smilax leaves with a pink flamingo can be combined in a large but delicate arrangement in tones of greys and brown-reds to light pink.

This arrangement has appeared in a professional man's office. Wives of professional men here can in this way develop artistic appreciation by patients visiting a doctor's office. *Arranged by Mrs. Robert C. Shaeffer, Allentown Garden Club.*

This container of ancient Greek style has a rare classic quality suitable for a modern home. The fall material interpreting this season, carries dignity and grace with a pleasant harmony of subtle colors. Clipped palm, feathers, and fruits of hyacinths with sedum for a focal point are worked from the dark tones in the background to the light tones in the foreground. *Arranged by Mrs. Stafford Hendrix, Hortulus Club.*

SUCCESS WITH HOUSE PLANTS

Make environmental conditions favorable.

By WILLIAM ACKERMAN

NOW that the gardener's outdoor season is over, the house plant takes on a renewed importance. Many of us make the mistake of carrying over our garden ideas in caring for house plants. Often those techniques which work well in the outside garden give only fair to poor results indoors. It must be remembered that house plants live in a highly artificial environment where humidity, air and light are quite different from outdoors.

Most of the failures experienced with indoor plants are due to attempting to grow them under unfavorable conditions. Your home may be perfectly comfortable for you, but to your plants it might be quite adverse. One might say that you have two alternatives in growing house plants successfully; either adjust the house conditions to suit your plants or select your plants to suit your house conditions. I think very few people will argue against the fact that the latter system is by far the most practical.

Careful Selection of Plants

What plants then, should be chosen? In certain plant families, we find a number of subjects which are well adapted to "take" the indoor environment. Plants with tough, leathery leaves and stems are the most tolerant. For example: *Ficus,* or the rubber plant; *Aspidistra,* cast-iron plant; *Sansevieria,* mother-in-law's-tongue; will flourish where many of the more tender plants such as gardenias and snapdragons would probably fail completely. Many members of the Lily family do very well as house plants. Some of these are: *Dracaena,* in several species and varieties; dwarf varieties of *Aloe;* also *Gasteria* and *Haworthia,* interesting South African succulents; *Asparagus* species grown for ornament such as emerald feather, and asparagus fern are alos good house plants.

There is a large group of succulent plants that do exceptionally well under house conditions, including such well-known genera as *Bryophyllum,* sprouting-leaf; *Crassula,* jade plant; *Lithops,* living stones; *Fenestraria,* windowed plant; and *Faucaria,* tiger's jaw.

Other delightful plants which grow well and will brighten up your home are the many different kinds of *Philodendron, Aglaonema, Dieffenbachia, Homalomena, Pothos, Syngonium, Schismatoglottis, Nephthytis,* and *Monstera.* Among vine plants there are a few grape relatives such as *Cissus rhombifolia,* ivy grape; *C. capensis,* capegrape; and *C. antartica,* kangaroo grape. The English ivy can also be grown if the temperature is not kept too hot. Then of course there is the cacti group, which almost anybody can grow well indoors.

This listing is by no means exhaustive nor is it meant to be. There are dozens upon dozens of other plants that grow well under house environment conditions. Some of these are a little more tender, requiring more care, but are well worth the extra trouble; for example, some of those with hairy leaves such as African violet and gloxinias. Then again many people claim the Begonia and Geranium take an astonishing amount of abuse and somehow still survive.

Up to now, we have discussed how you can select your plants to conform with your house environment; it seems only fair that the plant advocate do a little herself to make their stay a happy one. Therefore, let us explore what can be done for the house plant to make it thrive as well as just survive.

Atmospheric Moisture

Humidity — In the greenhouse or even in the open garden the humidity is much higher than in the average home. The relative humidity of the greenhouse usually amounts to 60 per cent or over, but in the average home, when the heat is on, it seldom exceeds 30 per cent except in the kitchen, bath, or laundry. Realizing this, it is not strange that the leaves of many plants curl, the flowers fade, and the plant finally collapses when brought into this oven-dry atmosphere. There are several ways to decrease fatigue in plants by increasing the humidity. Pans of water may be placed on heated radiators. If the house is heated by a hot-air furnace, be sure that the humidifying device with which it is equipped is in working order.

A tray of moist gravel makes a good base for potted plants. It prevents the soil from drying out too rapidly and raises the humidity around the leaves where it is most needed. Growing plants in a Wardean case or other glass enclosure permits conditions whereby those plants which require high humidity can be successfully grown. A modi-

fication of this method may be employed by using a glass screen to partially or completely enclose a bay window. With this system there is of course danger of cold snaps lowering the temperature of the window area quite considerably, since it is enclosed from the main room area.

Lightly spraying the leaves of plants, except those with hairy leaves, with water at least once a day will help considerably in the plants' fight against dryness. Another suggestion is to place the plants under the shower about once a week, giving them a thorough spraying with cool water. This greatly improves the moisture situation and also removes dust, soot, and to some extent the oil film that often settles on leaves from burning kitchen fats. Beware of spraying African violets or gloxinias, because cold water on the leaves of these plants causes yellow spots and mottling, especially if the plants are exposed to direct sunlight while still wet.

Soil Moisture

Watering — The question arises as to how often house plants should be watered. Actually no simple rule can be formulated that will satisfy all house plants. The requirements and factors involved are quite complex, but the senses of sight, touch, and hearing, if used properly, can bring the indoor gardener through most difficulties. If you see that your plant is wilting even slightly, you can be reasonably sure that moisture is lacking; a glance at the soil surface may confirm the diagnosis — it will be lighter in color when dry. For most plants it is best to water them before the wilting point is reached. If the soil looks moist and feels moist probably no water is needed. However, if at the last watering you did not give the plant a good soaking, the soil may be moist on top but completely dry below the surface. The presence of this condition can be determined by tapping the side of the pot lightly against some hard object. If the resulting sound is dull, no water is needed. If a ringing sound is heard, the soil is undoubtedly dry beneath the surface and watering is needed. If you still are not certain whether the plant needs water or not after tapping, you can always turn the pot upside down with your hand over its mouth and tap the edge of the pot, removing the pot ball.

Watering is best done in the morning when the temperature is rising. Transpiration is more rapid during the day, resulting in the loss of water from the plant material. Also, it is not good to have plant and soil wet when the temperature is falling, for this can result in chilling, stunting and in some cases conditions favorable for the growth and spread of fungus diseases.

The temperature of the water used can make a considerable difference in the growth and well-being of house plants. Water should be of about room temperature or even a few degrees higher. If cold water is used the roots are chilled and plant growth stops at least temporarily. If this practice is continued every day, plants may not show any appreciable growth for weeks.

Plants may be watered from the surface or from below. Most plant growers will use both methods at one time or other, depending upon the circumstances. Bottom watering generally furnishes more uniform moisture throughout the pot soil than surface watering done by the inexperienced grower. Amateur growers often tend to fill their pots with too much soil, leaving insufficient room for adequate watering unless it is repeated very frequently.

Containers

Pots — There are, principally, two kinds of pots that you can grow your plants in; the fancy decorative glazed pots sold by many flower organizations for rather fancy prices, and the common porous clay pot with the drainage hole in the bottom. The first type looks very fine, but your plants will generally prefer the more drab porous pot. I am not implying that you should not use the glazed pots at least the type with a drainage hole in the bottom, but don't kid yourself into thinking your plants will grow better in them. Flower pots *should,* however, have drainage holes. A glazed pot without a drainage hole provides no way for excess moisture to drain off. Consequently, a single overwatering may be sufficient to cause stunting or death of the plants.

Light

Sunlight — Plant growth and flower formation are dependent upon sunlight. Foliage plants require less light than flowering plants. Understanding this, it is not difficult to arrange your plants so that the flowering types are located near the window's edge and the foliage plants are toward the center of the room or near a wall.

In winter, give your flowering plants as much direct sunlight as is possible. Even window sills differ in their value from a light standpoint. A southern exposure of course is best, which is followed by exposures on the east, west and lastly north side of the house. Plants are phototropic, that is, they move toward the light, so unless you want lopsided plants, you had better turn them around every few days.

During the wintertime when sunlight is not too plentiful, plants benefit quite considerably from even artificial light. Floor lamps with brackets for holding potted plants can be practical as well as attractive during dark winter months. Of course, the presence of reading lamps and other lights in the same room with plants will have some effect on plant growth, but the amount of illumination decreases with the square of the distance, so their benefit diminishes greatly if not rather close to your plants. A 100- or 200-watt bulb is about the right size to use, keeping the plants one to two feet away from the bulb to avoid damage from heat radiation. It is well to keep in mind, however, that it would take 50 or more such bulbs to equal the strength of direct sunlight that comes in the window free of charge.

HUNZA

The Land and the People

Last month began a series of photographs of the Hunza Country, taken by Eva Maillart, now living in Switzerland. They will be continued over the next year, frequently being supplemented by excerpts from *The Healthy Hunzas,* by J. I. Rodale. The book may be purchased from RODALE PRESS for $3.00.

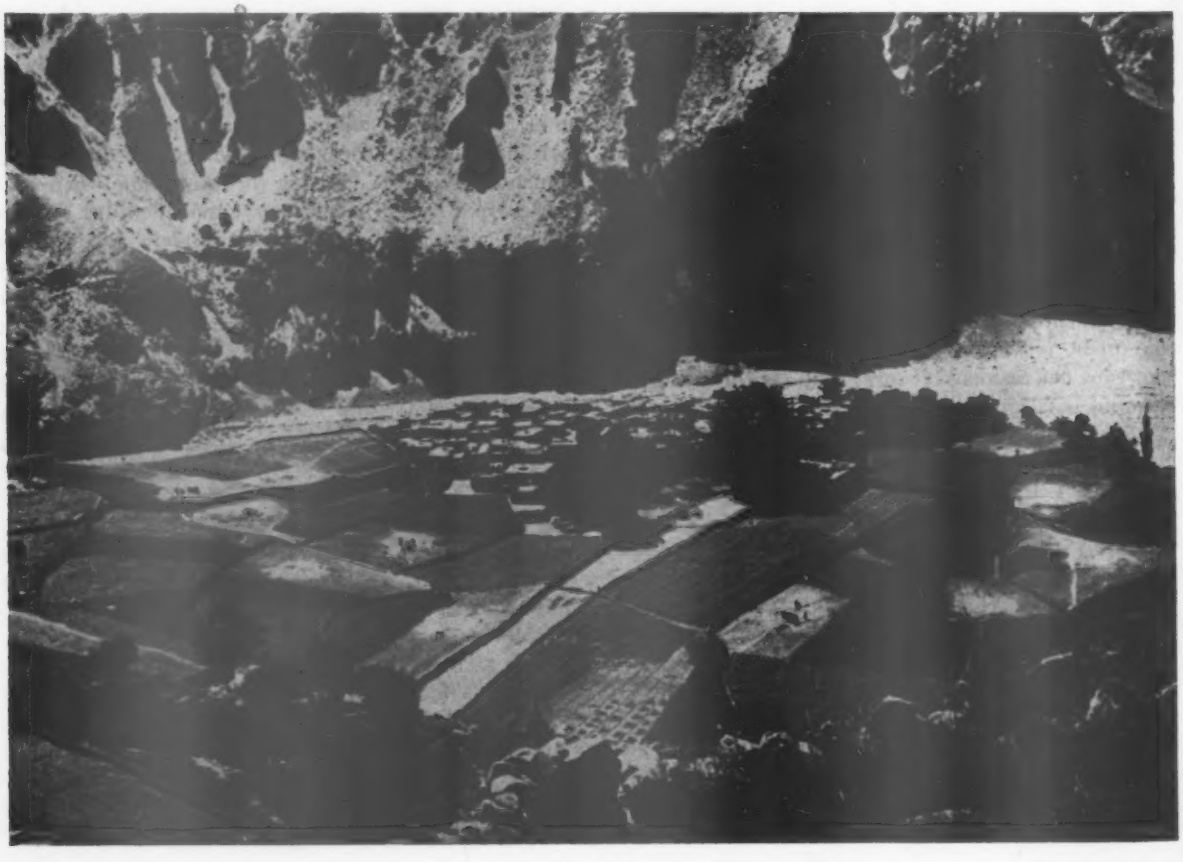
RIGHT —

One can understand very clearly the precarious journey that is necessary when a traveler penetrates into the Hunza country. All transportation must be done with sure-footed donkeys climbing through mountainous terrain and over rushing glacial streams. A native and his animal are shown crossing the Hunza River, below Misgor in Kashmir, on a cantilever bridge.

BELOW—

The panoramic view of the Aetit village illustrates one of the rare, relatively flat areas of the Hunza land. The valley is really a patchwork of terraced crop fields, intensively worked to produce two harvests every year. The threshing places are visible, scattered through the fields.

The long, narrow polo field, near the center of the picture, is the only ground in Hunza large enough for the playing of this national game.



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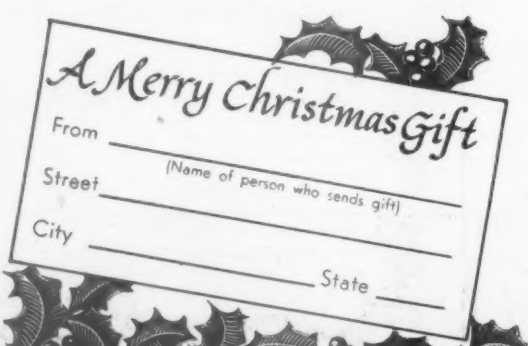

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★

Turn page for other CHRISTMAS gift suggestions . . .

WINTER VEGETABLES

Sun's heat can be utilized in winter.

By OLIVE JENNINGS

A COLD frame is really a protected seed-bed and can be used in the first frosty days of autumn just as advantageously as in early spring. Last fall I used one of my frames for salad greens and *we enjoyed tender lettuce and crisp endive until after Thanksgiving.*

My frame is 10 feet long and 3 feet wide and divided into three compartments, each with a separate sash. Instead of glass, we have covered the sash with plastic Flexi-Glass which makes it much lighter to handle and is not so easily broken. Flexi-Glass must be soaked in water and thoroughly dried before it is tacked to the frames, as it shrinks about an inch.

As my frame had been used in the spring for raising vegetable plants, there was a good supply of loose, composted soil in each compartment and I had kept it covered so that it was free from weeds. I watered it well about two days before planting and leveled it off with a board early in September.

I chose two kinds of lettuce, tender Oakleaf and small crisp Bibb, the broad-leaf type endive known as Escarolle and plain parsley. I planted these seeds in one compartment in rows three inches apart and about one-quarter inch deep, covering the seed with vermiculite to prevent damping off. I then watered the rows with a fine spray, adjusted the sash and placed a covering of light boards over it. As soon as the seeds sprouted I removed this cover and raised the sash several inches to allow good circulation of air.

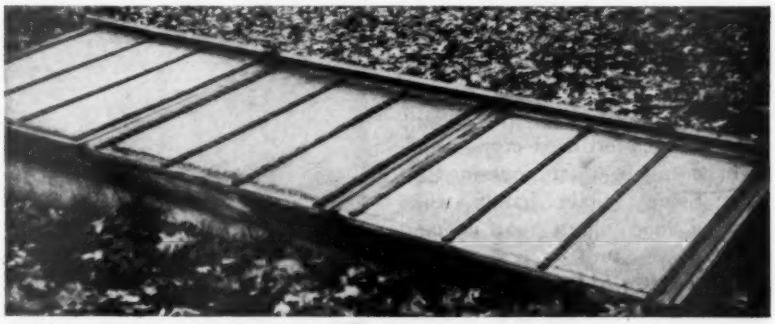
These seedlings grew rapidly and when they began to crowd each other, were ready to transplant. I prepared the other compartments of the frame by adding 2 to 3 inches of sifted compost to the soil, and set the little plants about 3 inches apart in each direction. Again I mulched with vermiculite and kept them shaded for a few days. As the plants grow they can be thinned and the thinnings used in salads. The remaining plants will then begin to form heads.

When the nights grew frosty I closed the frame tightly before sundown to hold the day's heat within, opening it again each morning. If the nights were very cold I covered the frame entirely with a blanket and banked leaves around the sides. If the day remained cold I removed the blanket for light and kept the frame closed.

It was amazing how much cold these plants could stand under glass. As the season grew late they were occasionally frozen but by being sprinkled with cold water and kept in the dark they revived and came back in good condition. It is possible to have fresh salads until winter. We felt well repaid for the time we had spent. When the greens were all gone I still had young parsley, which I transplanted into pots for the kitchen windowsill. These plants lived all winter and provided feathery green decoration as well as seasoning.

My husband removed the dirt in another frame for about 18 inches. Before the ground froze he placed turnips and rutabagas from the garden in this frame on a layer of straw. He covered them with more straw, then with the sash and boards. These vegetables kept crisp and unfrozen all winter. He also packed late celery in another compartment, covered it with sash and boards and it kept well until Christmas.

Our cold frame is truly a year-round helper in raising and storing many of the good vegetables we enjoy on our table.



Flexi-Glass makes it much lighter to handle.

WATCH YOUR N-P-K!

Nitrogen, phosphorus, and potassium are major plant nutrients taken by plants from the soil.

By RUTH RODALE

WE OFTEN hear that the three elements most necessary for living plants are the trio, nitrogen, phosphorus, and potash, commonly called N-P-K. These elements will often make up at least half of the minerals in plant tissue. The following article is an outline describing some of the known and not-so-well-known values for which the N-P-K combination is responsible.

Nitrogen

The functions of nitrogen have received probably more attention than those of any other mineral. How very natural! For the commercial farmer and gardener found that nitrogen is associated generally with high crop yields. But are you aware of the less spectacular but basic ways in which nitrogen contributes to the well-formed and healthy plants?

1. Nitrogen will produce a heavy, leafy growth, giving a large crop yield of lettuce and spinach especially. Most nitrogen absorbed into a plant is manufactured eventually into protein, the organic material that makes up the living part of plant cells.

2. Nitrogen-fertilized crops usually have much water contained in their tissues, again handy when growing food plants that demand tender leaves. Protein, it seems, has a natural affinity for water and will cling to almost as much as is available to it. The softness of leaves is also helped by the thin, stretched-out cell walls from an abundance of nitrogen.

3. High-nitrogen plants, particularly when chemically fertilized are most susceptible to fungus disease. The watery tissue and thin cell walls make it particularly appealing for threads of fungi to penetrate.

4. Plants with plenty of nitrogen have a rich green leaf color.

5. Nitrogen available at the fruiting time will insure a large fruit set. When deficient in nitrogen, the plants often have a heavy fruit drop.

6. Color and flavor of fruit are dependent on the nitrogen supply. Excess, however, will show considerably more damage than a deficiency. High nitrogen causes poor, almost faded color as well as a low sugar content. Sugar content will be low in root crops, too.

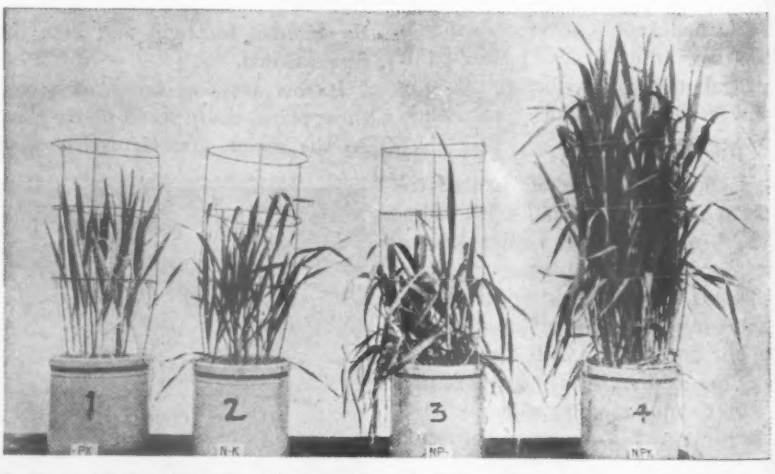
While most of these qualities are peculiar to nitrogen nutrition, best results are found when the nutrition of the other minerals is in order.

Microorganisms will not rob plants of their nitrogen supply to break down organic matter put into the soil.

Potash

Potash is the mineral that concerns itself chiefly with carbohydrate manufacture, whether starches or sugars. Although potash is not put into the carbohydrate molecules, all starch and sugar making stops when

(*Continued on page* 58)



Barley in Crosby silt loam of low fertility — Pot 1 (PK), nitrogen starvation. Pot 2 (NK)-phosphorus starvation. Pot 3 (NP) potash starvation. Pot 4 nitrogen, phosphorus, and potash supplied.

NOVEMBER GARDEN CALENDAR

By WILLIAM H. EYSTER, Ph.D.

NOVEMBER is a month of retrenchment and preparation for winter. The leaves of deciduous shrubs and trees gradually lose their green color and change to yellow and then often to crimson red, bronze, sometimes white as in birches, and finally brown. While this color change is going on, an abscission (cutting) layer is being formed at the base of the leaf which finally cuts the leaf off the twig and it falls to the ground. The fallen leaves constitute nature's winter mulch which absorbs the winter rains, prevents erosion, regulates the temperature of the soil and prevents it from freezing, and, best of all, it serves as food for the soil organisms. Nature gives a wonderful demonstration in mulching which all gardeners should copy.

The evergreens—conifers, rhododendrons, laurels, hollies, and many other trees and shrubs have a heavy coating of wax over their leaves to prevent excessive water loss. In the leaves are also formed certain antifreezes,, as pentosans, which prevent the sap in the leaves from freezing. Evergreens also drop their leaves, but not all at once in autumn as do the deciduous shrubs and trees. The leaves of evergreens remain on the plants for two or more growing seasons.

Biennial plants, as evening primrose and foxglove, which grew from seeds sown in the spring, now consist of a large fleshy root filled with reserve food and a small crown stem bearing a rosette of leaves which press themselves close to Mother Earth's breast for protection against the cold winter winds. The kindly leaves of neighboring shrubs and trees are blown over them by winds to form a protective winter mulch. The herbaceous perennials withdraw to underground stems or roots for winter protection. Annual plants ripen seeds which fall to the warm earth and remain dormant until the appropriate time in spring. And so it may be seen that each kind of plant has a way of spending the winter successfully and growing into new life when conditions favorable to growth return.

November must be regarded as an important garden month. We must give proper attention to the soil which, as a living organism, must be fed and protected during the winter months. We should make every effort to return to the soil all crop residues and all organic matter which can be secured. Waste materials are all that Mother Nature asks. Can we refuse her the crumbs? Let us assist nature in tucking her plants in for the winter. Snow is nature's mulch in the higher latitudes and altitudes where the temperatures are apt to be lowest in winter. Where snows do not persist during the coldest parts of the winter, we must supply organic mulches.

The North

Flower Garden:—All plant residues from the flower garden should be gathered up and put on the compost heap or shredded and put back on the soil as a winter mulch and as food for soil organisms. Finish planting spring-flowering bulbous plants as tulips, lilies, and others. Mulch biennial and perennial plants.

Shrubs and Trees: — Shrubs and trees may be transplanted just as soon as they have dropped their leaves. This also is a good time to transplant evergreens, i.e. plants which have leaves which persist throughout the winter. Prepare the soil well with compost, and see to it that it is well-drained and supplied with pulverized rocks. Water the evergreens and, late in the month, mulch them with acid compost covered with a mulch of pine needles or shredded leaves. Remove all the suckers from the lilac bushes and fertilize them with a compost which includes some lime.

Cuttings of evergreens can be made at this time. Follow the instructions as given on page 24 of the November, 1949 issue of the *Organic Gardening* magazine.

Berries:—The strawberries should be covered, plants and all, with a loose winter mulch of straw, salt hay, or similar material which will not pack. Mulch with shredded plant materials, as leaves, the raspberries, blackberries, currants, gooseberries, and other small fruits. A good compost made without lime will insure a good set of delicious fruit next year. Other mulching materials are sawdust, shredded bark, peat, and shredded plant residues of almost any kind.

Vegetable Garden:—Celery and root crops as beets, turnips, carrots, rutabagas, should be stored for winter use. Carrots, parsnips, salsify, and other hardy root crops may be left in the soil all winter for spring use providing the ground is

properly mulched after it freezes lightly. Put all the vegetable wastes through the shredder and return to the soil as a mulch or as compost. All the soil of the garden should be covered with a winter mulch.

The West Coast

Flower Garden:—All hardy annuals as larkspur, bachelors buttons, godetia, Virginia Stocks, nigella, anagallis, poppy, and sweet pea may be sown outdoors in November. Early planting insures earlier blooms, better plants with a long flowering period. Perennials having seeds with hard coats may also be sown at this time. The freezing will break the seed's dormancy and often crack the hard seed coat and thus facilitate germination. Nearly all lilies do well and should be planted in November. Mulch the chrysanthemums with loose material which will permit the free circulation of air.

Vegetable Garden:—There is still time to sow seeds of vegetables for early spring use—garden peas, windsor beans, onion sets.

Shrubs and Trees:—The roses may be pruned anytime between November and February, but should be planted in November. You will like such occasional roses as the floribunda, pillar, climber, and species for covering banks, angles of buildings, and walls. Every garden should include pyracantha and the many cotoneasters with their scarlet berries, laurestinus with its metallic blue berries, the low-growing pernettyas with berries ranging in color from white to pink-rose. Both cone-bearing and broad-leafed evergreens may be planted this month.

The South

Flower Garden:—This is an excellent time to have a Chrysanthemum show and bring the flowering season to a glorious conclusion. Plant spring-flowering bulbous plants and sweet peas.

Lawn:—If the winter lawn has not yet been planted, it should be done without further delay.

Shrubs and Trees:—Deciduous shrubs and trees, including roses, should be pruned at this time. Also Christmas holly can be transplanted most easily, but use lots of finely ground leaves and leafmold. Also plant all kinds of berries.

Vegetable Garden:—For the late winter and early spring use, plant the hardiest of the cool-season vegetables. Lettuce and radishes should be planted in hotbeds and coldframes for winter use. Clear away all plant residues and put them in the compost heap or put them through a plant shredder and return them to the soil. Plant asparagus, cabbage, and rhubarb.

The Lower South *

Flower Garden:—Water hyacinths, with their beautiful, delicate flowers, deserve a place in any garden. In Florida they are easy to obtain. If no larger body of water is available, they may be grown in an ordinary bird bath. No soil is required, and new growths of small plants are constantly being produced from the

original plants. The stems are ornamental as well as the blossoms. Plant the usual fall list: ageratum, alyssum, arctotis, asters, baby's breath, bachelors buttons, balsam, blue lace flower, calendula, calliopsis, candy tuft, carnation, cynoglossum, Shasta daisy, delphinium, dianthus, gaillardia, strawflower, hollyhock, larkspur, lupine, nasturtium, pansy, phlox, California poppy, petunia, Queen Anne's lace, salvia, scabiosa, snapdragon, sweet pea, statice, verbena, vinca.

Vegetable Garden:—To add a touch of beauty to the prosaic vegetable plot, raise crimson runner beans and roselles, the latter sometimes called Florida cranberries. The plants are easy to grow and have a profusion of red blossoms. Only the calyx is used. They are liked for making jelly or jam and are used in drinks. Also to be planted this month are: beet, broccoli, Brussels sprouts, cabbage, Chinese cabbage, carrot, cauliflower, celery, collard, eggplant, endive, garlic, kale, kohlrabi, leek, lettuce, mustard, onion seed and sets, romaine, rutabaga, swiss chard, spinach, turnip.

Trees and Shrubs:—At the risk of repeating a warning as to trees in or near the garden, be careful in the selection of sorts best adapted to the purpose. A recent long-continued fight against a giant maple that ran its roots near the surface and into garden plants and citrus trees for a distance of 30 or 40 feet from the trunk, suggested this topic. After years of struggle, it was finally taken out, "root and branch," though the trunk measured more than three feet in diameter near the ground. Australian pines have the same bad habit, and in addition, put out new trees all along the roots. If a tree that does not make an appreciable shade is wanted, the *Cocos plumosa* is excellent, and satisfactory as an ornamental. Sweet gum is ideal for appearance and freedom from running roots. It has abundant foliage and is suitable for a shade tree. As a shrub, or small tree, the Surinam cherry is fine. Used as a hedge, its vari-colored leaves are attractive. When allowed room to grow by itself it produces a large crop of the cherries.

The Southwest **

November with its deceptive daytime temperatures hovering around 70 degrees F. or over may mislead you, if you are not familiar with the low 40's at night which slow down rapid growth. The season for fast growth of fall sown annuals and winter vegetables is over. Cleaning up after the long growing season is in order. Utilize every bit of material you can in making compost: falling leaves, rakings of old lawn, summer weeds, vegetable waste, tender prunings, etc. Collect a large amount of dry refuse and make a pile or fill a bin. Use humisite as an activator.

Start with 12 inches of dry material wet down thoroughly, and put on a very thin sprinkling of humisite. Continue with the 12 inch layers and the sprinklings of humisite, ending with the thin top sprinkling of humisite. Be sure you soak each layer thoroughly. After the third layer tramp in the dry refuse. When you have finished spread several layers of newspaper over the top and fasten securely. A square or rectangular pile or bin conserves the heat and moisture best. In bins, for aeration, allow spaces between the boards or bore 1 inch holes at irregular intervals. Use a diagonal pole tester to gauge the moisture. A pile made in the afternoon will be very hot by the next morning. After the heat subsides introduce your earthworms and permit the sow-bugs to get in their good work. You do not need to put in layers of soil, for the humisite is rich in humic acid and has a high bacterial count. Manure is not necessary, and lime and ashes should not be added here in the alkaline Southwest. It seldom takes more than four weeks to make mellow compost. Humus is the life of the soil, and we need to keep adding compost continually for mulching and planting. Don't make a tiresome chore of composting. Have a hinged door at the bottom of your bin and scrape the finished product out as you want to use it.

November weather is often very variable in the Southwest. A few scattering rains may come, but not enough to soak the dry ground thoroughly. Your day temperatures may often run high until the last of the month; but, as the nights become longer and cooler, all growth slows down. You cannot expect any more rapid growth; and vegetables and annuals go into their winter resting period shortly after coming up, if put in at this time. "Shooting to seed" in early spring is the bane of the inexperienced gardener.

Flower Garden:—November is one of our leading bulb planting months. Take out your tulips which you have had in cold storage and plant in your borders nine or ten inches deep. The early tulips are not for us, but use instead the late Darwin, Cottage and Breeder types. The botanical tulips are fine. *Tulipa Clusiana* has long been used here and is highly recommended for pots or borders. Hyacinths, Dutch and French-Roman, daffodils in variety, scillas, hybrid amaryllis, bulbous iris, baby gladiolus and ornithogalums can be planted wherever the soil is properly prepared. Native bulbs can still be planted, and those advised earlier in the season can still be rushed in for succession. November is one of the best months for planting lilies. By all means try the fine new hybrids along with the old stand-bys. Ues Northwestern grown stock, planting those species and hybrids recommended for this region. You cannot go wrong with *L. Henryi, L. Maxwell, L. umbellatum, L. Shuksan, L. pardalinum* and the fine centifolious Olympic Hybrids. If your purse will permit, try some of the new Fiesta, Aurelian and Mid-Century Hybrids.

Perennials recommended for last month may still be set out to develop strong root systems after the winter rains come. Annuals for winter blooming should be coming on. Do not let them suffer for want of water. Mulch with compost and keep the weeds out. Wildflower seeds may be broadcasted in dry soil and will come up with the first rains like magic. Such deep rooting annuals as poppies, scarlet flax, larkspurs, clarkias, godetias, candytuft and linarias may be broadcasted or sown in rows. They do not need rich soil. Avoid thick sowing of fine seed, mix them with sand and sow lightly. Use ground covers over your bulbs. Baby Blue Eyes, Cream cups and Douglas Daisies are charming with early spring bulbs. After your bulbs come up, set in plants of pansies, violas and Bluebird forget-me-nots for ground covers.

Trees and Shrubs:—Native and hardy drought-resistants can be planted to advantage now to get the benefit of the winter rains. Grow your own Christmas wreaths by planting California Holly and holly-leaved cherry. Use well-grown canned material, being careful not to get any which has grown through the bottom of the containers. Water tropicals and sub-tropicals sparingly so as not to stimulate new growth to be nipped by the first heavy frosts. Water your deciduous material, both fruit and ornamentals, if they need water until the first soaking rains come. Shape up and stake trees and shrubs for winter. Transplant and set out camellias.

Vegetable Garden:—Continue planting cover crops on all unused land. *Melilotus indica* and purple vetch are excellent. Windsor beans are recommended highly for a winter cover crop and on account of their luxuriant foliage and large nitrogen nodules are excellent for making rich compost. Peas, Chinese edible pod peas, Windsor beans, radishes, onions (set and seedlings), Southern curled mustard, Chinese mustard can be planted now. In the sunny part of your garden set plants of loose-leaved lettuce and Swiss chard and rhubarb chard. Make divisions of many of the perennial herbs. Make root-cuttings of horse radish. Evergreen Oriental leaf garlic, *Allium tuberosum*, will furnish you garlic througout the year. Divide and reset your chives. Constantly enrich your soil with compost and top mulch to prevent drying out on the surface due to high day-time temperatures and drying winds which may be frequent in the late fall and early winter.

The Rockies ***

Flower Garden:—It might be smart to do some of next year's gardening now and avoid the spring rush; it's very simple: all you do is prepare your soil and then sow some of the many sorts of seed that germinate

(*Continued on page* 58)

MISCELLANY

By J. I. RODALE

Taking Stock

THIS column is being written on the first of September and it is time to take a look around and reflect on the first year of the operation of the new organic method on our experimental farm and in our gardens. In this year of 1950 we made practically no compost for the farm. In former years we filled nine large pits consisting of about ten tons to the pit. In one of the pits this year we put compostible material two feet high instead of the usual five. We did this so that it would not heat up We also placed a large quantity of earthworms in this material. In the last few weeks I have come into possession of a large quantity of horse manure which we wished to apply to the barley and wheat crops to be planted in the next few weeks. We mixed the finished compost that was made two feet high with this raw horse manure so that the bacteria would mix with the fresh manure and break it down quicker. We notice that it is darkening quite nicely. It is handy to have some finished compost around the place to be used for various activating purposes.

At various times during the summer we have obtained various kinds of organic matter such as corncobs, grain mill screenings, weed cuttings from a nearby park system and have run it through our ensilage cutter. Then the green matter was broadcast over a growing clover field which is to be plowed down for a corn crop next spring. This is sheet composting. There will be sufficient time for it to decay before we grow our corn. We have applied limestone potash and phosphate rock over some of the fields. Wherever it is at all possible we grow green manure crops which are not taken off the land but plowed under as a fertilizer for the next crop. Our yields are as usual ahead of the average for our territory but we will not be able to get the actual average figures for a few months. Last year we were about 40 per cent ahead of the average.

The practicing of the organic method on our farm is easier now that our men do not have to make compost on a farm scale. Since we have obtained our manure loader, however, making compost would be much easier than when we formerly assembled the materials and loaded the finished compost with pitchforks. To those who are making compost it would entail less labor if they are made in heaps rather than in pits when they are to use a manure loader. The latter can get at the material much better if it is out in the open. The two turnings required by the Howard method can be made quite simply with a manure loader.

However, to conserve the nutrients as much as possible, my suggestion is to prevent oxidation by the two-foot method described above. Dr. Ehrenfried Pfeiffer of Three Fold Farm, Spring Valley, N. Y. can furnish cultures of bacteria which keep the heating *down*.

In the Garden

In most parts of the garden we applied mulches. We also applied compost made for us in our workshop cellar by our earthworms, a finely decomposed material which is made in a two-month process. Gardening should be a combination of these two materials. The mulching idea will take several years to work out. It is possible that certain plants may be found to thrive better without mulches. It will take a certain amount of experimentation to discover this. It is best to chop up mulch material. It will decay better.

Insect infestations were a little worse this year than last because it had been a warm winter. A good cold winter kills out a large part of the insect larvae. But we had more than we needed of vegetables without spraying. Why a gardener would want to spray is beyond me. The organic method reduces insect or disease troubles. It does not eliminate them entirely. There is better luck on some soils than on others. In the early part of the season we had practically no insect trouble with the earlier crops. It was only in the latter portion of the summer that we had a little trouble. Our first crop of cabbages headed out wonderfully and did not show a single insect bite. Readers, please do not hesitate to write to us of your experiences in applying the new organic method.

Farm Visitor

One of the visitors of *Organic Gardening* a few weeks ago was a large potato grower who described to us the champion yields he has been able to secure with the use of chemical fertilizers. "But," he said, "Do you think I would eat those potatoes? Not me. We have a separate patch where we grow potatoes by the organic method for our own use without chemical fertilizers or poison sprays."

Chemical Fertilizer Investigation

In connection with the resolution that recently passed Congress unanimously to conduct an investigation into chemical fertilizers and chemicals used in foods, on August 21, Congress voted a fund of $30,000 to start the investigation. It will be interesting to follow the activities of the committee that has been appointed to carry on this work.

England

A little item in the French journal, *La Vie Claire* of June, 1950, says:

"From Our Foreign Correspondents"

In England the price of chemical fertilizers will increase from 30 per cent to 35 per cent, the government having withdrawn its subsidy. A wonderful opportunity to return to more reasonable methods of agriculture!

Reader's Letter

Here is what a reader writes us:

"Mr. Phillips is no longer engaged in raising mink, and his orchard is beginning to deteriorate. He is now raising trout on a commercial scale and while I was there, he asked me whether or not he had any legal redress against one of his neighbors whose poison spray had been carried by the wind into his trout pools and had caused the loss of four thousand of his fish."

I believe he does, but it is difficult for a person to court the enmity of a neighbor by bringing suit.

Paper as a Fertilizer

I recently washed my hands and dried them with a brown paper towel. Then I threw the paper towel into the waste-paper basket. After awhile the thought came to me, is this not a good fertilizer? This kind of paper is not bleached with strong chemicals and is very close in its makeup to the wood pulp from which it is made. It can be mixed with table cuttings and will decay very readily.

The Organic Method and the Teeth

Here is a very interesting item reprinted from the *Dental Record* of February, 1950, written by Dr. Arthur A. Blake:

Much has been studied and written about the relationship of nutrition to human diseases of all kinds. But too little attention has been paid to the importance of having food that comes from healthy soil that is nourished by natural fertilizers.

The missing element in soil that is ravaged by erosion and artificially kept producing by chemical fertilizers, is humus. If we believe in the cycle that nature has established of life, growth, death and decay, then life again, we must return the animal and vegetable wastes to the soil. They, in turn, supply life and fertility and we must supply calcium and phosphorus in adequate amounts.

Figures from the Royal Commercial Traveler's Schools show that in 1939: 50 per cent of the children had 0-2 cavities; 32 per cent had 3-5 cavities; and 18 per cent had 6 or more cavities. In 1941: 56 per cent of the children had 0-2 cavities; 27 per cent had 3-5 cavities; and 17 per cent had 6 or more cavities.

A new head gardener arrived in 1941 and the school became self supporting, growing its own food and using only organic methods. Pigs and chickens supplied animal waste. Even clippings from the playing fields supplied some of the green stuff.

We now have the figures for 1949. In fact, the figures from 1945 to 1949 are amazingly consistent. Among the boys, 99.19 per cent had 0-2 cavities, among the girls it was 97.5 per cent with 0-2 cavities; 0.81 per cent of the boys and 2.5 per cent of the girls had 3-5 cavities, and not one child had 6 or more cavities.

No change has taken place other than that in the school gardens. We have been told of a relationship between nutrition and tooth structure. But I humbly suggest that healthy food from healthy soil must become an additional control.

Frazer Compost

In the August 22 issue of the *Toledo Blade* there is an item which states that the Frazer Products, Inc., is to build a plant in that city which will cost $320,000 for the purpose of making compost from the garbage of the city. The Frazer interests are also negotiating with the city of Los Angeles for the building of a half a million dollar composting plant for the city garbage. The Frazer company has a plant operating in the Chicago stock-yards which turns manure into compost in only five days. By Christmas this plant will be geared up to produce 60,000 tons a year. Eventually it will be rare to find a city that will not have one of these garbage digesters.

Free Fur

Last month I related in this department how a lady reader of *Organic Gardening* wrote in to say that she had made compost out of a couple of old fur pieces. A few days after writing about it I was on the way to New York and in the railroad station of Allentown, Pa., met the Emmaus furrier, Mr. Platt. I related the incident to him and he smiled. He did not think that fur had any fertilizer value. "Why," he said, "I pay money each week to have a load of fur scrap taken to the dump."

"You will not have to pay anymore," I told him. "We will come and move it for nothing." As a result we now have a nice pile of fur scrap on our farm and will turn it into compost. Fur is extremely rich in nitrogen.

A Dangerous Insecticide

The following is an item from *Gardening Illustrated,* published in England, August 1950 issue:

Every responsible research worker in the country appears to be opposed to the use of Parathion as an insecticide, yet we hear of more and more commercial nurseries using it. Fortunately the fashion does not yet seem to have spread to private gardens, though that may be due more to the difficulty of purchasing Parathion in small quantities than to a true perception of its dangerous nature. Our objection to Parathion is not that it is a very powerful poison, but that it is a subtle poison which may kill suddenly even when the user thinks he is perfectly safe. The reason for this is that it destroys an essential compound in the body which cannot be replaced readily. Successive minute doses of Parathion, which may be absorbed through the skin, may gradually reduce the supply of this compound until the danger line is passed. Then muscular paralysis occurs.

We are not so short of good chemicals with which to kill aphids and red spiders that we need use any so subtly dangerous as this. Moreover, we think that manufacturers and vendors of insecticides would do well to remember that if fatalities do occur the publicity given to them will almost certainly harm the sales of insecticides in general. We are not defending in advance any such illogical attitude on the part of buyers but merely pointing out that whenever a serious scare occurs it is always difficult to confine it to the real issue at stake.

SUMMER CROPS FOR WINTER

How to store vegetables, fruits and seeds.

By LEONARD WICKENDEN

THE gardener who does not find himself, at times, with more vegetables on his hands than his family can consume is a rarity. For all gardeners, it is good economics to preserve such excess for winter use, but for the organic gardener it is especially advantageous to do so, firstly because his vegetables are likely to be better keepers than those grown with commercial fertilizers, secondly because they will be of far better quality and flavor than those bought at the store. On all counts, therefore, he should give serious thought to the problem of winter storage.

Vegetables can be roughly divided into three groups:

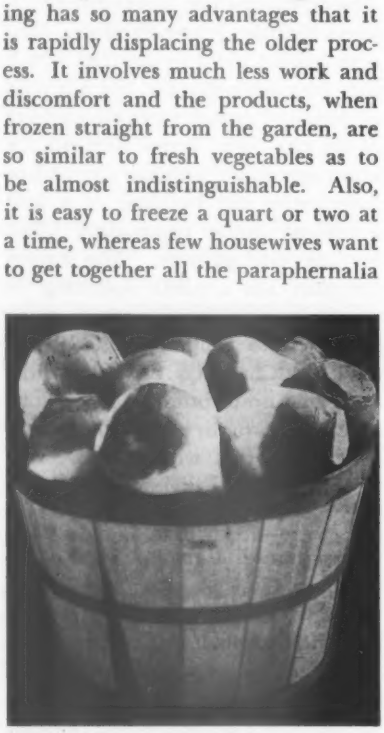
(1) *The quickly perishable* such as green peas, green limas, corn and asparagus, and green vegetables such as spinach, chard and lettuce.

(2) *The slowly perishable,* in which we include broccoli, cauliflower, late cabbage and onions.

(3) *The good keepers,* consisting of potatoes, turnips, beets, carrots, and similar root crops, together with pumpkins, late squash and celery.

The three groups are not very sharply divided. Under proper conditions, late cabbage and onions will keep for a long time, but with them there is a greater danger of spoilage than with most root crops. Cauliflower and broccoli seldom remain in good condition for more than two or three weeks, so they almost belong in the quickly perishable group and in my household are usually included with them. Peas and beans, when dried, belong, of course, in the group of good keepers.

For the quickly perishable group, the two chief methods of preservation are canning and freezing. Much work has been done on drying green vegetables but even under skilled technical control the resulting products make poor food; the amateur had better leave the process alone. In comparison with canning, freezing has so many advantages that it is rapidly displacing the older process. It involves much less work and discomfort and the products, when frozen straight from the garden, are so similar to fresh vegetables as to be almost indistinguishable. Also, it is easy to freeze a quart or two at a time, whereas few housewives want to get together all the paraphernalia for canning unless they have a sufficient accumulation of vegetables to make the effort worth while.



Winter turnips

Reliable freezers can now be bought for about $220 up, according to size, and for almost any man who has a vegetable garden it is money well spent. If he grows strawberries, raspberries, blueberries and other small fruits, a freezer is almost indispensable. Once he has it installed, he will wonder how he ever lived without it.

It is, however, with the storage of good keepers that this article is mainly concerned. Given the proper facilities, the carrying of this group through the winter is a simpler process than either canning or freezing, yet I suppose there are ten households that freeze or can to one that stores unprocessed roots or other crops. It is common enough to store potatoes but few backyard gardeners seem to provide themselves with a winter supply of turnips, rutabagas, beets, carrots, onions and celery, and even fewer trouble to put away pumpkins, squash, late cabbage or sweet potatoes.

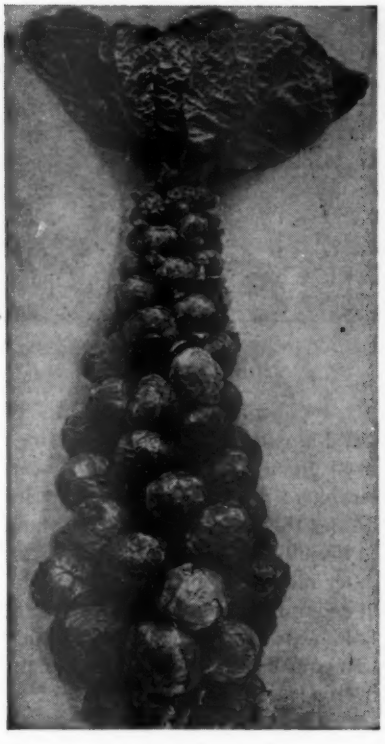
Two obstacles seem to account for this: in the first place there is a good deal of uncertainty regarding the conditions needed; in the second, there is a feeling that such conditions are difficult to provide. The aim of this article is to remove the uncertainty and to suggest simple methods of providing the necessary conditions.

Let us assume that we have reached the end of the growing season and find ourselves with rows of vegetables still standing in our garden. We have already had a few light frosts and a real freeze-up may come any day. Our potatoes have already been dug, our onions gathered and dried. Both have been placed in a dark, cool, dry place for storage — perhaps an unlighted corner of an unheated attic, since the cellar with a furnace in it will be too warm. What shall we do with our turnips, rutabagas, beets, carrots, leeks, parsnips, late cabbage, Brussels sprouts, pumpkins and winter squash?

First let us eliminate the leeks, parsnips and Brussels sprouts. All these can be left where they grew, although if you want to be sure to have a cooking of leeks or parsnips at any time during the winter, and if you live in a location where the frost goes deep, there is danger of the crops becoming frost-bound and you will want to store at least part of these two crops with the other roots. If you can stand living without leeks or parsnips for a few weeks (personally I could live without parsnips until the day of my death) leave them undug. They will be fine when the thaw comes in the spring or during a warm spell in midwinter such as we had last year.

As for Brussels sprouts, frost improves their flavor and you can leave them in the garden and usually go on cutting until January, by which time the crop will probably be about used up. If not, they will often come right through the winter and be ready for you by the middle of March or thereabouts, especially if they are buried under snow for most of the winter.

Onions



Brussels sprouts

So we are left with our other root crops, our late cabbage, our celery, our pumpkins, sweet potatoes and winter squash. Under what conditions can they be kept? Put very briefly, root crops, cabbage and celery need cold (not freezing) and moisture, while pumpkins, squash and sweet potatoes need warmth (not heat) and dryness. Pumpkins, squash and sweet potatoes are treated pretty much alike. They must first be "cured" by leaving them in a really warm place for two weeks (75 to 85 degrees) and then kept in a dry atmosphere at a temperature of 50 to 60 degrees. I have a large screen which I use for sifting compost, six feet long and two feet wide, with a half-inch mesh screen. In the fall, I put a couple of two-by-twos across the top of the boiler of my furnace and place the screen on them. Any vegetables that need curing go on the screen and are turned over a few times so that they are evenly cured. After ten to fourteen days, I remove them to a cooler spot in the cellar and they keep well.

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Holiday Plants

It's difficult for house plants to stand up under the sudden change from greenhouses to the hot dry atmosphere of the house. Wilting indicates the plant needs a rest. Many of these plants need plenty of water. After blooming, cut back the foliage of such plants as hydrangea, or withhold water until the leaves of such plants as cyclamen fall. Store plant in basement and water only every two or three weeks. In late spring move to the garden. Repot in July and bring indoors in the fall before a hard frost. With luck you may have flowers again.

Drainage

Ivy and philodendron should not be grown in glazed pots. It is best to have some drainage, but they will grow in porous pots.

Pink or Blue Hydrangeas

The greenhouse hydrangea is one of the few plants of which the florist can change the color of the flowers. Hydrangeas growing in acid soil have blue flowers; those growing in alkaline soil have pink flowers. Grow pink flowers by adding limestone to the potting soil. If you want blue flowers use an acid compost by substituting acid peat for soil and omitting the lime, wood ashes or other alkaline materials from the compost.

Storing Tuberous Begonias

Store tuberous begonias in peat moss, sand, or sawdust at a temperature of 45 to 60 degrees. It is important to keep the storage material just slightly moist so that the tubers do not become completely dried out.

Wandering Jew

Cut off pieces of Wandering Jew and start growing them in water for the winter. Many gardeners have found that a piece of charcoal added to the water is very beneficial. Place the starting plants in a sunny window.

Geraniums

Here are a few hints about that very popular house plant, geranium. Geraniums respond well to lots of sunshine, though they need some protection from strong midsummer sun. They like moist soil, not too large pots, and fresh air. They are quite susceptible to gas fumes. Good drainage is necessary. They should dry out a little between waterings.

Chrysanthemums

After hardy chrysanthemums are through flowering, it is best to cut them back to within a few inches of the ground.

Winter Mulching

For those gardeners who find it difficult to obtain mulching material, here is a tip. Use glass wool house insulation. Just spread the batts over the plants. It is very easy to handle, and also enables light to reach the plants – something few other mulching materials will do. The soil will be protected, while the light penetration seems to be a factor for giving a better stand of flowers the next year. When it is time to remove the mulch just roll the batts up and store them in a dry place.

Stored Vegetables

If you have stored some of your garden vegetables for winter use, it is a good idea to check them now to make sure no decay has set in. Also start checking them regularly every two or three weeks from now on through until they've been used up. If rot or decay does set in, it's best to find it out in its early stages, before all your vegetables become affected.

Canned Goods and Jellies

When storing your canned goods and jellies it is best to keep them in a dry, cool, dark room, at a temperature of 40 to 60°. Jars should be stored on shelves and spaced so that they are not touching each other.

Root Cellar

An ideal root cellar can be constructed by making a double wall with an air space between, and an insulated roof. An 8-inch terra-cotta flue is placed in the bottom and run through a trench to a point well outside the root cellar, where it is brought up to the surface and hooded with a wind-operated ventilator several feet above soil level. The roof also has a ventilator with a damper. This system maintains good aeration and yet constant temperature in the cellar, since air coming in the bottom vent will have been warmed by the soil. Root cellars must be well drained to prevent water standing on floor or gathering in low spots.

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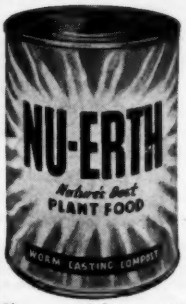

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Cut off pieces of Wandering Jew and start growing them in water for the winter. Many gardeners have found that a piece of charcoal added to the water is very beneficial. Place the starting plants in a sunny window.

Geraniums

Here are a few hints about that very popular house plant, geranium. Geraniums respond well to lots of sunshine, though they need some protection from strong midsummer sun. They like moist soil, not too large pots, and fresh air. They are quite susceptible to gas fumes. Good drainage is necessary. They should dry out a little between waterings.

Chrysanthemums

After hardy chrysanthemums are through flowering, it is best to cut them back to within a few inches of the ground.

Winter Mulching

For those gardeners who find it difficult to obtain mulching material, here is a tip. Use glass wool house insulation. Just spread the batts over the plants. It is very easy to handle, and also enables light to reach the plants — something few other mulching materials will do. The soil will be protected, while the light penetration seems to be a factor for giving a better stand of flowers the next year. When it is time to remove the mulch just roll the batts up and store them in a dry place.

Stored Vegetables

If you have stored some of your garden vegetables for winter use, it is a good idea to check them now to make sure no decay has set in. Also start checking them regularly every two or three weeks from now on through until they've been used up. If rot or decay does set in, it's best to find it out in its early stages, before all your vegetables become affected.

Canned Goods and Jellies

When storing your canned goods and jellies it is best to keep them in a dry, cool, dark room, at a temperature of 40 to 60°. Jars should be stored on shelves and spaced so that they are not touching each other.

Root Cellar

An ideal root cellar can be constructed by making a double wall with an air space between, and an insulated roof. An 8-inch terra-cotta flue is placed in the bottom and run through a trench to a point well outside the root cellar, where it is brought up to the surface and hooded with a wind-operated ventilator several feet above soil level. The roof also has a ventilator with a damper. This system maintains good aeration and yet constant temperature in the cellar, since air coming in the bottom vent will have been warmed by the soil. Root cellars must be well drained to prevent water standing on floor or gathering in low spots.

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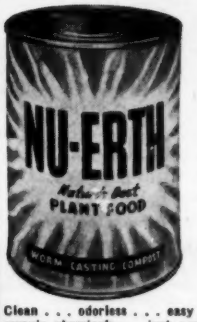

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Backyard Orcharding

By NASH CHANDLER

THE new dwarf fruit trees are considered the wonders of the century. These fruit trees have come to stay permanently with us. Their excellence in the small garden and small acreages makes them almost indispensable. They are quite different from the usual mammoth specimens which so often occupy the entire garden, for these are scarcely taller than man. They can be pruned and the fruit thinned or picked without the aid of ladders. They yield heavier crops than standard trees, comparing them to size, and they produce a better quality of fruit. These fruits, too, have a higher color than those from the orchard.

One of the first questions asked is what causes these trees to be smaller. Under ordinary circumstances the buds of, say, the McIntosh or any other kind are "budded" in the summertime on to young apple trees raised from seed. But in case of the dwarf trees special stocks are used; stocks which have a restricting influence on the ensuing growth of the trees. These stocks are known as East Malling Number Nine.

In continental Europe varieties were propagated by budding and grafting on to seedling stock or roots, just as we in the United States do today. The old French nurserymen were quick to realize that seed from different sources gave entirely different types of trees. One man would become famous for stocks which gave low-growing trees, another for tall, vigorous ones but which came into bearing very slowly. It is quite easy now to see how these types were used under different conditions. The tall ones went into the commercial orchards while the dwarf trees were in demand by private gardeners, amateurs, and small fruit growers.

It soon became knowledge among fruit men that these different types could be propagated by layering, thus ensuring uniformity among the resulting trees. Seedling stocks vary considerably in shape, size and often fruiting qualities. And that is when the Frenchmen began to propagate vegetatively.

It was about the middle of the 19th century that an Englishman by the name of Thomas Rivers began to propagate by layering a type of stock which later became known as the Broad Leaved Paradise. Others soon followed until there were many different types. Unfortunately they soon became mixed until nobody knew whether he was buying dwarf or large trees. It was Dr. R. G. Hatton, Director of the East Malling Research Station in England, who made a study to classify types. He made an exhaustive examination of every procurable type and after many years of work separated them into sixteen groups. These groups are known as East Malling stocks, one to sixteen. The most dwarfed of these is know as Number Nine. Dr. Hatton found this stock to be about one quarter the size of the normal tree. It began to bear fruit very early in life, from two to four years after planting and according to variety.

This is much earlier than those grown by American fruit growers. This in itself is a very salient factor when the gardener decides to plant fruit trees. Take the Northern Spy,

it begins to bear in the fifth year instead of the ninth year on standard trees; Cox's Orange Pippin in the second and the McIntosh in the fourth year. Take Melba Pear – it begins to bear as early as the second or third year after planting. *This is a factor of the utmost importance.*

The grower of dwarf fruit trees receives a good return for his outlay much quicker than if the ordinary type of orchard tree is planted.

The cultivation of dwarf trees is similar to that of the standard trees, but they do respond quickly to good manural treatment. Dwarf trees on East Malling Number Nine have a tendency to throw out roots above the union when the latter is covered with soil. If this does happen, the tree will lose its dwarfedness and grow into a large tree. To prevent this, the union must remain above ground at all times. Plant shallow and see that the union is well above the soil level.

Pears grow on a dwarfing stock, the fruit is generally larger, and where the variety has a red color, this color is enhanced and one gets a more acceptable fruit. Although early bearing is not so pronounced as in the dwarf apple trees, dwarf pears tend to produce earlier in life. They vary from one-third to two-thirds the size of standard pear trees, which makes them acceptable to the home grower. The pear tree most commonly used is the Quince A, while Quince C, a cousin of the former makes a still smaller tree. And the special stocks used for the dwarf pears are known as Angiers Quince. Fruit growers, however, think the Quince C will be the one in general use before many years, although the stock of this variety is quite scarce at present. It is now under test and shows promise of being superior to Quince A for garden purposes.

Gardeners can eliminate some of the headaches of fruit growing by planting these dwarf trees. These dwarfs have many qualities which cannot be overlooked, and those who contemplate planting fruit trees next Spring should give serious thought and consideration to these trees. It would pay anyone to do so.

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ORGANIC WINDOW GARDENING

By WILLIAM H. EYSTER, Ph.D.

BY window gardening is meant the growing of plants indoors and most commonly in windows where a sufficient amount of light is available as energy for photosynthesis. Photosynthesis, as doubtless every reader knows, is the combining of water and carbon dioxide, using light as a source of energy, to form carbohydrates like sugars, starches, and celluloses.

As winter approaches, many gardeners move plants from their outdoor gardens to the window garden as a part of their winter garden. These plants include those that are regularly grown in the outdoor flower garden and plants which are more strictly house plants and have been put outside for the summer. Other gardeners and especially those who live in many-storied apartment houses are limited to indoor gardening because there is no space for a regular garden outdoors. Such indoor gardeners usually have a highly selected list of house plants which have been found, from experience, to grow and blossom satisfactorily in the window garden.

Window gardening is perhaps the most universal kind of gardening, as the facilities necessary for such a garden are available to all, regardless of where they live. Successful window gardening involves the selection of suitable plants and the provision of favorable environmental conditions, as pointed out by Mr. Ackerman in his article on House Plants in this issue.

By organic gardening we mean following, so far as possible, nature's methods and providing so far as practicable the conditions which are most favorable for the various kinds of plants included in the window garden. The window is a completely artificial environment so far as plants are concerned. The window gardener should know something about the native habitat and natural environment of each of his window-garden plants. Some plants, like aspidistra, can get along with a minimal amount of light; others like African violet which is a native of African woodlands require plenty of indirect light and a moist atmosphere; while still others, like the common house geranium (Pelargonium) must have a sunny window. The organic gardener will consider his plants' requirements for each of the other environmental factors as moisture, humidity, tolerance to fumes, temperature, and soil requirements.

The Soil

The window box and flower pot must be regarded as miniature, portable gardens. In addition to holding the soil, these containers must be of such nature and construction as to provide adequate drainage and aeration so that the soil will be a favorable environment for the plant roots and the microorganisms which live in the soil and play important roles in the plant's nutrition.

Some house plants, such as Bromeliads and Cacti, thrive in a soil that would prove to be inadequate for most other plants; others, like the Chinese Evergreen, can get along very well for long periods on just plain water and air; but most of them require a soil high in humus and rich in minerals.

Soils for the window garden are formulated by mixing together in suitable proportions such ingredients as loam, sand, pulverized rocks, and organic matter in the form of compost, leaf mold, muck, and peat. Some suggested potting mixtures are given below:

1. *General Potting Mixture.*
   2 parts good garden loam.
   1 part compost, leafmold, or other fermented organic matter.
   1 part clean coarse sand.
   To the above mixture, add pulverized phosphate rock and potash rock (granite dust or greensand), each at the rate of a tablespoon for each potful of mixture.

2. *Potting Mixture for Seedlings.*
   1 part good garden loam.
   1 part compost, leafmold, peat, or other form of humus.
   2 parts clean coarse sand.

3. *Potting Mixture for Humus-loving Plants.*
   1 part good garden loam.
   2 parts compost, leafmold, peat, or other form of humus.

1 part coarse, clean sand.

To this mixture should be added pulverized phosphate rock and potash rock (granite dust or greensand) at the rate of 1 tablespoon of each for each 6-inch pot of mixture.

4. *Potting Mixture for Cacti.*

1 part good garden loam.
2 parts of coarse, clean sand.
1 part broken pots, coarse gravel or small stones.

To this mixture may be added pulverized rock phosphate and potash rock (granite dust or greensand) at the rate of 1 tablespoon of each for each 6-inch potful of mixture.

These potting mixtures represent various soil types which must be considered in the window garden. Potting mixture 1 will best meet the requirements of many house plants, and particularly those which occur naturally in mineral rather than in organic soils. For woodland plants, as ferns, African violet, primroses, and azaleas in the window garden, use potting mixture 3. The potting mixtures given above may be modified in one way or another to still better meet the requirements of special plants. In the case of acid-loving plants, for instance, acid peat may be added to give the soil an acid reaction, and lime may be added to make a soil mixture neutral or slightly alkaline.

By adding compost and such insoluble but plant-available minerals as phosphate rock and potash rock, the soil in the window box and flower pot will have the capacity of supplying the essential plant nutrients for a relatively long period of time, or until the plant needs to be repotted. This makes unnecessary the feeding of the plants in the window garden with manure water which gives off an unpleasant odor or with soluble chemical salts which usually make the plants susceptible to insects and diseases.

The best forms of humus in mak-

(*Continued on page 56*)

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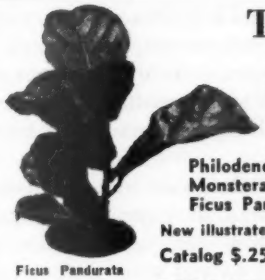
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(*Continued from page 55*)

ing up the potting mixtures are compost and oak leafmold. If compost is not available, use the leafmold. This can be collected in almost any woodland, or it can be made from autumnal leaves. If the leaves are shredded and then put in heaps mixed with a small amount of soil, leafmold can be made in a comparatively short time.

Environmental Factors

The organic method in the window garden involves following nature's method in every detail. To illustrate, let us take the African violet. This plant is a native of woodlands in tropical Africa where the days are approximately 12 hours long, the light is dilute, the air is moist or humid, the moisture is adequate, and the soil is rich in humus and decaying plant residues. So far as possible, these environmental conditions should be provided for African violets in the window garden. They should be potted in a humus-rich, well-drained soil (Potting mixture 3), and kept in a window where all the environmental conditions as temperature, moisture, and light are favorable to the growth of these popular and highly ornamental house plants.

The Pelargoniums (commonly called geraniums) are semi-shrubby plants from the sunny plains of South Africa and other parts of the world. There are many varieties, some of which are grown for flowers and others for foliage which may also be scented. These plants prefer an average good garden soil, and should be potted in soil as given in potting mixture 1. They prefer the sun and will do best in a sunny window, preferably with a southern exposure. Pelargoniums like a dry rather than a moist air, and should be kept on the dry side so far as watering them is concerned. A place can be found in the window garden where these beautiful plants will be reasonably happy.

So with all house plants. Learn something about their occurence in nature and especially the kind of habitat they prefer. Then in selecting your house plants, do not include those that require conditions that you cannot provide. The number of window garden plants is so large that all the available space can be occupied by plants which are apt to do best in each window where the conditions are not too different from their natural environment.

Potting and Repotting

The best time to repot established house plants is in the spring (April or May). Plants which are to be transferred from the outdoor summer-garden to the winter-garden must necessarily be potted in the fall. Dig the plants carefully so as to secure as many roots as possible. The soil must be neither so wet that it is muddy and the roots cling together, nor so dry that the soil crumbles entirely away from them. A moisture content favorable for transplanting can be secured by thoroughly watering the plants about six hours before potting. After potting, thoroughly water the plants and set them in a shaded place to recover the shock. As the plants recover, as indicated by their general appearance, transport them to their place in the window garden.

Cuttings and seedlings should be potted in small (2-inch) pots and then transferred to larger pots as soon as the small pots seem to be filled with roots. The soil should have just the right amount of moisture. If water can be squeezed out of the soil or if it does not crumble after being squeezed in the hand, it is too wet. In planting, do not use a pot larger than is necessary. Too often, amateurs use a pot that is one or more sizes too large.

Organic Foods Division

The Organic Directory is now completed, containing producers of organic foods from all parts of the United States. Write to us for an up-to-date copy, price 25c.

Answer to our critics

(*Continued from page* 15)

norant of the most elementary aspects of the processes that were in his hands. Because food growing was left to ignorant peasants the world ate food that was lacking in those qualities that could nourish the human organism and give it comfort, that could make that organism healthy and happy and satisfied to go along without fighting destructive wars. From now on the growing of food must be of interest to the man in the cities, to the physician, to the Congressman. The growing of food that will nourish the human organism the best must even be of interest to the Department of Agriculture in Washington and to the Agricultural Experiment Station in Massachusetts.

The organic method, with its concern over the piling into the soil of the maximum organic matter possible, with the advocacy of the safest method of soil mineral feeding in the form of rock materials, with the growing of green manure crops, with fallowing, with strip and contour farming, with the planting of a tree for every one cut down but with the exclusion from the soil of the too soluble and harmful-residue-containing chemical fertilizers, will mean the ushering in of a new era in the history of man and his well-being. With science we can make the application of the organic method a closely controlled process with the benefit of modern machinery and methods. We must throw peasantry techniques into the discard. We must tie it in with the agricultural and the medical colleges. We must enlist the best scientific talent, the type of people who have conceived the atom bomb, and have them take all of the available residue organic matter and show us how to decompose it in the quickest possible time while preserving its maximum nutritional content.

When man begins to eat all of his food raised in such a method he will become a new kind of man such as the world has never seen before. He will be a well-nourished man. There will be no more Hitlers, for Hitler was an ill-nourished man. There will be no more Nebuchadnezzars or Napoleons. I believe we are approaching a golden age and the basis of it will be the God-given soil which will be handled in a godly manner. The organic method gives higher yields and produces a quality of food, less of which is needed to satisfy the requirements of the human organism. There may have to be controlling of quantity in the population according to the limits of the land to produce, as is done by the Hunzas today. Man must not leave the producing of his food wholly in the hands of the farmer. He must peer behind the curtain because part of him is there. The future looks bright. It will become known to later historians as the organic age.

(*To be continued*)

Crinums

(*Continued from page* 24)

and a fine stout root growth has been developed before the tiny new leaf starts up into the world. With that wise and careful preparation the new bulblet then makes a rapid growtn and will flower in from two to ten years, according to its heritage.

There have been many great figures in Horticulture who have been devoted to the genus *Crinum*. All of these have left their fine hybrids to enrich the gardener. Dr. Theodore Mead, Dr. Henry H. Nehrling and Louis Bosanquet did wonderful work in Florida. Cecil Houdyshel of La Verne, California, has produced many fine hybrids in that State.

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Garden Calendar

(*Continued from page 45*)

in the springtime. If you're late with your bulb planting get at it soon; condition the soil with compost discreetly. Check on depths for the bulbs. Tulips last longer if put down deep. If you've got a big planting job to do and can't seem to find the time, a good way to trick Jack Frost is to cover your planting area with insulation in the form of a mound of dirt or leaves; that will frostproof your bed so you can dig in it as late as December or even January. If you have a fireplace — and you must have one of those cheery institutions, if it's nothing more than a semi-circle of large stones — save the wood ashes, particularly if you're burning hardwood; next year the potash and other nutrients will make you a better plantsman. This is the time to give your rock-garden a going-over. Root up some of those snapdragons that have self-seeded all over the place; also get rid of any untidy clumps of tall grass that have intruded here and there. Walks on the prairie these tangy days are fun; be alert to spot Cacti — Pincushions and Prickly Pear — that will look right in your rock garden or in a windowsill garden indoors.

Indoor Garden: — Have a kitchen garden to the extent of at least a couple of pots of herbs, say parsley and chives, which we hope have survived outdoors thanks to frost protection. If you haven't already done so, send the nurseryman your order for winter-blooming bulbs, or get them at the local garden supply store. Paper White Narcissus are well worth the small trouble and you might try your luck with house-grown hyacinths, tulips, daffodils, freesias. Don't overlook that truly fine house plant, the amaryllis; properly grown in a potting mixture not too rich with compost, it will give you unrivaled blooms. For wall decoration it's hard to beat ivy and philodendron. The ever-popular and ever-blooming geraniums and begonias put up with our harsh house conditions uncomplainingly. If you are a windowsill gardener, those cacti you picked up on the prairie should be bedded in midget pots sunk to their rims in sand; they'll need no care beyond a spoonful of water now and then and can give you lots of joy.

Now that our outdoor gardens are sad and sorry sights, it is well to visit nature's fields and mountainsides and observe how gracefully her plants have taken the killing frosts. Be ready to pounce on objects that can dramatize a table top or book case or coffee table: grasses, milkweed pods, seed heads, pine cones, gnarled stumps, twisted branches, cattails. Sheltered nooks in the foothills may yield late-blooming flowers or foliage plants, or some of those aspen leaves that were recently dipped in the shiniest gold. Be a conservationist, though, and take only what can easily be spared. If you hit for the high country be a rock-hunter, you and your whole family. You can always use to excellent effect on your home grounds a slab or two of granite prettily peppered with salmon-pink and yellow-green lichen, and hunks of quartz, the kind that sparkles merrily in the sun, and mellow-hued sandstones.

Watch Your N.P.K.!

(*Continued from page 42*)

potash is not available. Here are a few other reasons for potash fertilizing.

1. Potash can do more than any other mineral to counteract excesses of nitrogen. While high nitrogen may cause plants to lose their resistance to disease, a good supply of potash will increase resistance. The plant can then readily construct cell walls to house extra protein with the increased starch and therefore cellulose. Fungi will have trouble boring through the firm outer tissues that are built up. Good potash supply will encourage sturdy plants.
2. Fruits will be richly colored.
3. High potash for root vegetables

will generally be helpful, in fact for almost any crop that is mainly starchy or sugary (corn, potatoes, sugar beets, wheat).

4. Potash will improve the keeping quality of certain fruits and vegetables, and the flavor of others, especially grapes.

5. A deficiency of potash will interfere with cell division, causing stunted growth.

6. The growing time for vegetables is increased under a high potash supply.

7. Winter kill can be reduced.

Phosphorus

While potash content of soils may often run as high as two per cent, phosphorus is not usually so widespread. As a result deficiencies have brought stunting and low offspring rates in both plants and animals.

1. Plentiful phosphorus will mean rapid growth of fruits, sometimes five to ten days earlier than without it. Phosphorus is needed in any parts of the plant whose cells are multiplying fast. The protein which must be built contains a high per cent of phosphorus. The seeds will accumulate a great deal in readiness for germination, possibly over 50 per cent of the phosphorus present in the plant.

2. Fruits will be heavier when well supplied with phosphorus.

3. Without phosphorus plants will set a very low number of blossoms.

4. Phosphorus helps the root system, increasing the lateral, fibrous roots so that a plant is better equipped to draw on soil moisture in case of a drought.

5. Starch will not change to sugar in the plant cell unless phosphorus is available.

6. Use phosphorus for firm stems and leaf texture.

7. Phosphorus will improve the yields of turnips, potatoes, cereals and sugar beets in particular.

8. The vitamin content of plants is increased when phosphorus is available.

None of these values are cut and dried, however. Although one mineral might be more effective than another in producing most of these results, they all must work together to do the job. For example, in getting heavy yields, it is not too easy to say which mineral is most responsible. Without one of the N-P-K group, the weight and volume of fruits will probably be low. With particular plants, such as tobacco, though, addition of potash to the soil will be more valuable in improving quality rather than quantity.

This article is no attempt to underestimate the function of trace minerals in the growing plant. We are merely recognizing that the N-P-K group makes up the largest concentration of minerals in the plant tissue. Trace minerals are automatically supplied when organic or rock fertilizers containing nitrogen, phosphorus, and potash are added to the soil.

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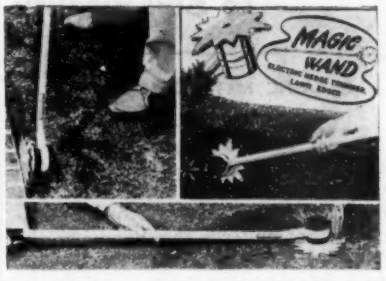

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Q. Any plants that I bring into my house wither and die. Have you any idea what could cause this?

A. Do you use gas in your house? It is one of the most prevalent causes of plant deaths in the home. Even small quantities of gas are detrimental.

Q. When is the best time to repot plants?

A. Plants permanently grown in pots should be repotted usually in the late winter. For young, actively-growing plants, transplant when the pot becomes nearly choked with roots.

African Violets

Q. How can cuttings be taken from African Violets?

A. African Violets may be started by putting the stems of healthy leaves in moist sand until they form roots. When they are well rooted, they should be transplanted into pots having a mixture of equal parts of sand and compost.

Q. What is the best method of watering African Violets?

A. African Violets, like almost all other house plants should be watered from the bottom. If they must be watered from the top, in no case

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should the leaves be made wet with water.

Q. My African Violets refuse to grow well. Does the strong afternoon sun they receive harm them?

A. African Violets are not partial to strong sunlight. They must have plenty of *dilute* light and a warm but moist atmosphere. These conditions are met in a north window of a warm house providing some care is given to moisten the atmosphere.

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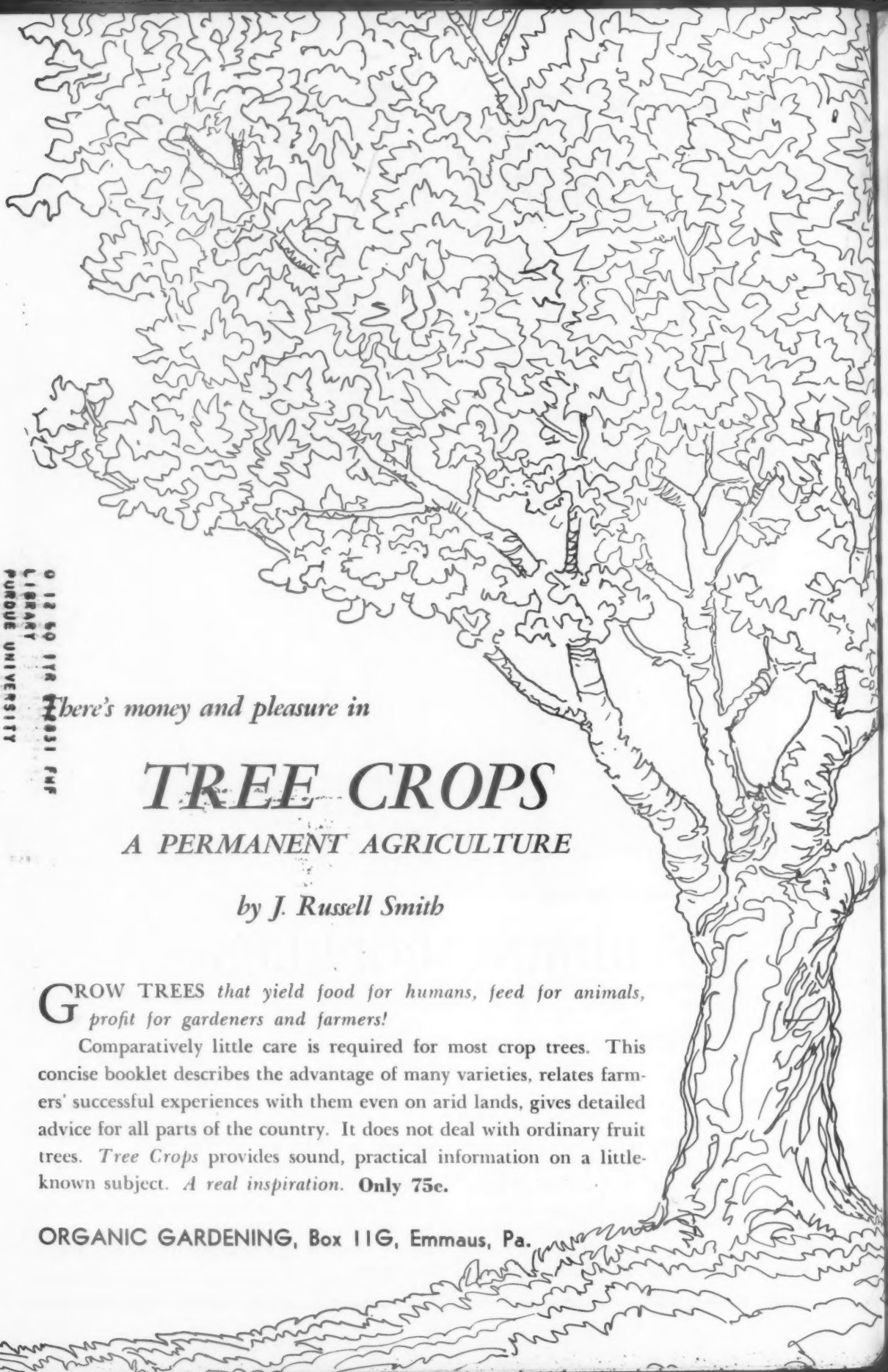
Var. *Americanum*

Cranberry Tree, High Bush Cranberry, Pimba.

THIS beautiful native shrub occurs in woods and along streams in northeastern United States and as far west as Wisconsin and Iowa. Because of a margin of sterile florets around the flower clusters, this viburnum is highly ornamental. The well-known snowball tree is a cultivated variety of viburnum in which all the flowers are sterile and showy. The leaves have the shape and general appearance of maple leaves. The dense and vigorous growth of the shrub makes it suitable for border or hedge. The showy red fruits are excellent for foods for birds in winter, and may be used as a substitute for cranberries.

A dwarf form may be used in rock gardens or low hedges.

All viburnums can easily be identified by their flat, disk-like seeds. Other species than the one mentioned above have ornamental value, but this one is typical.



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